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# Lateness of Plant Employees: A Study of Causes and Cures

By Ralph E. Motley, *Atlantic Refining Company*

*There are effective ways to control the tendency of employees to arrive late for work. How some of these ways were found and used by a large industrial concern is told concisely in this study from the Industrial Relations Department of the Atlantic Refining Company.*

THIS study was made by the writer in the Philadelphia plant of the Atlantic Refining Company, which is located in the southwestern part of the city, on the banks of the Schuylkill river. It takes into consideration the lateness of an average daily working force of from 4000 to 5000 plant employees over the five year period, 1921–1925. Office employees are not included in this study.

### WHY EMPLOYEES WERE LATE

Lateness had been the cause of considerable vexation to the management for some years. The monthly per cent had reached alarming proportions. It became apparent that unless this was brought to the attention of the employees in a very forceful and determined manner, it would continue to increase, and would eventually become a common practice.

To determine the causes for lateness, an investigation was made and the following factors discovered:

*Transportation.* The plant is located on the east bank of the Schuylkill river and at the end of Passyunk Avenue, the only street within ten blocks having an east and west car line extending to the river. This factor in itself limited transportation facilities to a great extent. Employees using this line were subjected to many delays, due to the fact that two sets of railroad tracks had to be crossed before the plant could be reached. Employees living in West Philadelphia were frequently delayed because of the drawbridge over the Schuylkill river being raised and lowered to permit the passage of seagoing vessels. Before company buses were put into service, employees living in West Philadelphia were compelled to take a very roundabout route to work, because east and west car lines do not operate as far south as Passyunk Avenue on the west side of the river.

*Distance.* About one-fifth of the employees lived within walking distance of the plant. The remaining four-fifths lived within a twenty-mile radius.

*Hours.* Working hours were from 7:30 to 5:00 Monday to Thursday,

7:30 to 4:30 Friday (pay-day), and 7:30 to 12:00 on Saturday. This meant that employees living on the outskirts of the twenty-mile radius would have to get a very early start and then make good car connections in order to reach the plant on time; and a majority of the employees fell in this class.

*Habits.* It was only natural to suppose that some of the employees had the "lateness bug" in their systems. They had always taken long chances on reaching the plant on time. There were others who had gradually acquired the habit of reporting late simply for the reason that little determined effort had been made on the part of the management to curb the increasing tardiness.

## REMEDIES FOR LATENESS

It was thought that by deducting one-half hour's pay from the earnings of each man who reported late, lateness could be reduced. However, this proved only a temporary remedy, for after the employees had become accustomed to this slight penalty, lateness again assumed its previous proportions.

In order to cope with the situation, a definite plan was adopted which would not only give publicity to the laggard departments, but would also stigmatize the individuals who were consistently late. The plan was as follows:

1. By the use of suitable forms, individual lateness records for each employee were kept by the Department of Industrial Relations. Each superintendent was furnished with a daily report showing the names and check numbers of those men in his department who were late. This would enable him to keep in touch constantly with the lateness record of his department.

2. A monthly report was sent to each superintendent showing the names and check numbers of those men in his department who had been late three or more times in the past month. Consistent lateness was considered sufficient cause for dismissal. This meant, for example, that if an employee were late five times a month for three months, or eight times a month for two months without showing marked improvement, he would be subject to dismissal.

3. A letter outlining the plan of the lateness drive was sent each superintendent by the plant manager. A minimum per cent of lateness was decided upon as a goal, and keen competition was created by including the monthly per cent of lateness figure for each department on the monthly labor report which was sent each superintendent. The record of departmental lateness also appeared in the Company's monthly publication.

## RESULTS OF THE EXPERIMENT

A study of figure 1, which represents the actual monthly per cent of lateness and also the average for each year, will clearly reveal the results obtained from this drive on lateness. The average lateness of 0.90 per cent for 1921 has been reduced to 0.50 per cent for the year 1925. This means that for every thousand employees working, there was an average of nine late each day in 1921, as compared with five persons late per thousand employees working per day for 1925. The sharp rise in 1923 was due to the

very unstable economic and labor conditions prevalent in that year.

The first point in figure 2 represents the average per cent of lateness for all the Januarys over the five year period 1921–1925. The second point represents the average of all the Februarys during the same period,

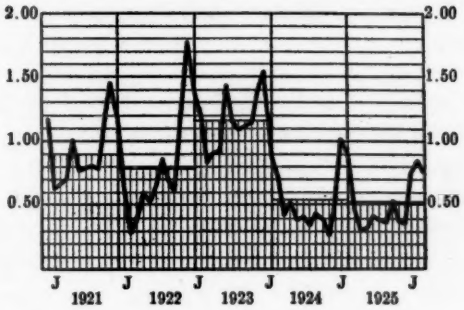


FIG. 1. MONTHLY AND YEARLY FLUCTUATIONS IN LATENESS

The curve represents the average per cent of lateness for each month during the five-year period. The checked portions represent averages for the respective years.

and so on for the rest of the months. This figure reveals a decided seasonal trend in lateness. The peak is reached in December, with 1.30 per cent, which drops off sharply until April when it starts on a slight upward trend. Figure 2 also shows a decided summer lateness period from April until August. In November lateness again starts on an upward trend, reaching the peak in December.

Summarizing this study, there is a definite seasonal trend in lateness. Lateness in general may be reduced by publicity of the laggard individuals

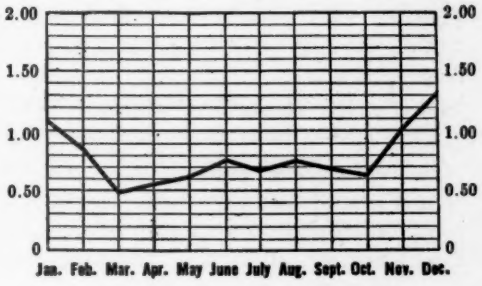


FIG. 2. SEASONAL FLUCTUATIONS IN LATENESS

The first point in this figure represents the average for all the Januarys over the five-year period, 1921–1925. The second point the average of all the Februarys, and so on for the rest of the months.

and departments, severe penalties for consistent lateness, competitive schemes, and constant determined pressure on the part of the management.

*(Manuscript received February 27, 1926.)*

# Vacations with Pay for Wage Earners in Foreign Countries

By Charles M. Mills, *Industrial Relations Staff, Curtis, Fosdick and Belknap*

*In Europe, provision for annual vacations with pay has since the war come to be a frequent practice for factory operatives as well as for salaried office employes and executives. The trend of labor legislation, of trade agreements, and of practice in individual concerns is all in this direction. Mr. Mills, who last summer studied foreign experience at first hand, here summarizes this movement and adds a digest of opinion regarding the social and economic effects of such vacations. This study is part of a larger report, which, together with an extensive investigation of American practice, made by the Industrial Relations Staff of Curtis, Fosdick and Belknap, will be published shortly in book form.*

SINCE the armistice, annual paid vacations for wage earners have become an increasingly important factor in industrial life in both the United States and foreign countries. In 1924, in response to a request from a client, the Industrial Relations Staff of Curtis, Fosdick & Belknap, New York, N. Y., made an investigation of vacation plans for wage earners in private industries in the United States, and issued a preliminary report for confidential circulation. This survey, continued since 1924, now includes a total of 198 separate plans in 292 different establishments, employing more than 500,000 workers. The report reviewed only annual vacations with pay. Leaves of absence and layoffs during the annual shutdown period were not considered as vacations. Wage earners were defined as hourly, day, or piece workers, as distinguished from salaried or clerical workers or executives. No effort was made to cover vacation provisions included in laws, civil service acts, or collective agreements. It was felt that the majority of public employes belonged to the "white collar" class rather than to the industrial group, and thus by custom, had received vacations for many years. Union agreements were not analyzed because of the comparatively small number of workers affected. The first step in the procedure of this study was the compilation of an address list of several hundred firms with vacation plans for wage earners, derived from an analysis of various public and private sources of information. A question-

naire was addressed to these companies, followed in many cases, by field investigation in important industrial centers. Interviews were thus held with many officials, supervisors, and employes.

At the conclusion of this study an attempt was made to summarize the same subject for European countries, based on such data as might be available in the United States. It was found, however, that the documentary material at hand was insufficient. Consequently, a field investigation was made in the period from July to October, 1925, in the leading industrial European countries. This article summarizes the more important points of this survey. The detailed tables on which this summary is based will appear in the complete report, to be published in book form.

### PURPOSE AND SCOPE OF INVESTIGATION

In the study of vacation plans in the United States, the facts showed that the movement had been developed very largely in private enterprises. In Europe a far greater proportion of wage earners have been engaged in governmental service than in the United States, and collective agreements between employers' associations and unions have been far more widespread. In studying conditions in foreign countries, it was natural that the data should include collective agreements and governmental regulations which cover workers belonging to both the salaried and industrial groups, as well as material concerning the practices of individual companies. It may be said, therefore, that the method of approach in the two studies has closely followed the trend of social and industrial conditions in the Old World and the New World respectively. In Europe, legislation and collective agreement have generally been the *modus operandi;* in America, private enterprise.

While the study is intended to cover the same group of workers as did the American study, it was not always possible to include only industrial wage earners. Vacation laws in some countries include both wage earners and salaried workers; in other countries, manual workers are on a salary basis; again, civil servants and governmental employes may be manual workers; collective agreements in many European countries cover clerks and municipal employes. So far as possible, however, the discussion is limited to vacations given with pay to workers of the wage-earning class.

This survey, therefore, seeks to answer the following questions in a general way:

1. What has been the historical development of the vacation movement in countries outside of the United States?
2. What are the vacation provisions in (a) plans of individual companies (b) collective agreements (c) legislation?
3. Is vacation legislation enforced?
4. What are the social and economic interpretations of the vacation movement?
5. What is the probable development of the vacation movement in the future?

### PROCEDURE

Field investigation was carried on in France, Belgium, Switzerland, Italy, Austria, Czechoslovakia, Germany, Netherlands, England, Scotland, and Wales. In each country outstanding

representatives of capital, labor, and the government were interviewed, including the leading bankers, manufacturers, secretaries of employers' associations and trade unions, managers, foremen, workingmen in individual enterprises, and American diplomatic and commercial attachés.

About 50 industrial establishments were visited in the various countries, including plants engaged in textile, clothing, food, iron and steel, agricultural implement, automobile, machine tool, watch and diamond manufacturing. Special studies were made in important manufacturing centers such as Lille, Milan, Prague, Berlin, the Ruhr, Amsterdam, and the Midland areas in England, and also at the International Labour Office at Geneva. The study included all existing information contained in the files of the latter organization.

Upon return to the United States, translation of all foreign material was made by an expert bureau. All data were then classified by countries so that a detailed picture of the vacation movement in each nation could be portrayed. This analysis included information not only from European nations, but also other foreign countries. The next step in procedure was to summarize the data from all countries to show the development and the present status of the vacation movement in individual company plans, collective agreements and legislation. Finally, the general social and economic results were outlined, so far as these results could be inferred from the collected data. There was no attempt to argue either for or against the principle of providing paid vacations for workers.

### *Definitions*

*Vacations.* A vacation is defined as a stated interval in a round of duties or employment, granted for purposes of rest or recreation, during which the worker is allowed to discontinue work entirely, but continues to receive his salary or wage. Generally, vacations are annual and are granted on condition that the worker has been employed for a certain length of time. Leaves of absence with or without pay are not considered as vacations, nor are accumulated rest periods given because of work on Sundays, public holidays or for overtime. In general, such leaves are granted for entirely different purposes than annual vacations.

*Holidays.* A distinction has been drawn between the word "vacation" and the word "holiday." According to American usage, the word "vacation" has come to mean a consecutive period of days while the word "holiday" refers to a specific day. This report does not touch the question of public or special holidays except in connection with the general discussion of annual vacations.

*Wage earners, workers, and employes.* Unless otherwise specified, the words "wage earner" and "worker" are used interchangeably through this report. The word "employe" in most European countries means a clerk or salaried worker, and not a manual laborer or wage earner. In some cases, however, salaried workers have been included in this report inasmuch as they belong to the working class group. This applies to certain classes of civil servants, governmental employes in postal, telegraph, and telephone serv-

ice, and certain types of workers in railways, banks, and shops.

### HISTORICAL DEVELOPMENT AND PRESENT STATUS OF THE ANNUAL VACATION MOVEMENT

*Early beginnings.* Previous to the Industrial Revolution, the only periods of rest and recreation for the working classes were the 30 or 40 annual religious holidays and fête days. With the advent of machinery, the number of these holidays was constantly reduced, and the former holiday privileges were retained only by the salaried workers. As time passed, the holidays of salaried workers were grouped into continuous periods of consecutive holidays or vacations, generally around the Christmas or Easter seasons or during a slack period in the summer months. Thus, paid annual vacations for salaried workers, generally of the executive class, became fairly well established before the middle of the nineteenth century. The industrial worker, however, was not affected in any way by this movement until the latter part of the century.

At this time, the owners of a few "family" concerns in England, as well as proprietors in a few similar establishments in Germany and Imperial Austria, started giving their older workmen, with long terms of service, a few days off with pay each year. Few, if any, such vacations were granted from the more modern point of view of the social and economic benefits arising therefrom. The whole procedure was one of kindly beneficence on the part of the employer. In no case was the employer obligated as he gave or withheld the vacation privilege absolutely as he wished.

In England, the passage of the Factory Act of 1901, providing that women and young persons under 18 years of age receive six annual statutory holidays, was a stimulus to the growth of the vacation movement. Although the Act did not grant the statutory holidays to men over 18 years of age, they generally received similar leaves.

*Second period of development.* Gradually, as individual concerns began to grant paid annual vacations, the workers themselves commenced to take an active interest in gaining these privileges more generally. It was not long, therefore, before the important trade unions made demands for annual vacations with pay. In the opening years of the twentieth century such privileges had been granted in England in a few important industries, such as the railway service, public utilities, and newspaper printing. Agreements were also reported in Belgium, Netherlands, Norway, Sweden, Switzerland, and the Union of South Africa, but in each country the number of agreements with vacation provisions was small in relation to the total number of agreements in force. In practically all agreements, vacations were granted only on the basis of the length of employment of the worker, the fundamental idea being that the vacation privilege was in the nature of a reward for service rendered.

No record of similar agreements in other important countries, such as France, Italy, Austria, Germany, or Russia, was found previous to the outbreak of the World War, although it may be presumed that some such

agreements existed. Thus, before the middle of 1914, annual vacations were confined to a few individual concerns, operated by the more enlightened employers in various countries, particularly England, and to a few collective agreements.

*Influence of the World War.* The annual vacation movement arose during the social and political upheavals of the post-war period. Previously, the principle of annual vacations had hardly been recognized in industrial life; after 1918, the movement became an important factor in the welfare of most of the leading nations of Europe. Within seven years, from the beginning of 1919 to the close of 1925, the vacation movement approached the eight-hour day or the forty-eight-hour week in importance. By the close of 1925, six European nations, Austria, Czechoslovakia, Finland, Latvia, Poland and Russia had passed compulsory vacation legislation for all wage earners, while 19 other legislative acts granted paid vacations for special industrial groups in Austria, Czechoslovakia, Denmark, Finland, Iceland, Italy, Luxemburg, Spain, Switzerland, and the Union of South Africa. In addition, collective agreements with vacation provisions had become widespread in Australia, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Union of South Africa, and Yugoslavia. In Great Britain, about 2,000,000 workers were affected by individual or collective agreements. Practically all the leading European nations, therefore, except France and Belgium, had widely accepted the principle of paid vacations through agreements or legislation.

Information covering certain types of vacations, holidays, and workers in Brazil, Chile, China, Mexico, Turkey, and Uruguay, although only remotely or indirectly connected with the vacation movement, were included in the general survey in order to reflect conditions in many different countries.

*Underlying factors.* The most important change affecting the vacation movement was the rise of democracies in place of monarchies. After the war the people, organized through powerful trade unions and largely represented by various Socialist parties, came into power for the first time in Russia, Finland, Poland, Austria, Czechoslovakia, and Latvia. Today, each one of these countries has a compulsory general act granting paid vacations to all workers under certain conditions.

Again, since the war, there has grown up a more intimate relationship between the various Socialist parties and the trade unions. Frequently the same men have been leaders in both the political and labor organizations. With the sanction and power of organized labor behind them it has been comparatively easy for such leaders not only to formulate legislation, but to secure adoption by various law-making bodies. Therefore, government today in many European countries is influenced by organized labor in other forms, such as the Labor Party in England, the Syndicalists in Belgium, and the Social-Democrat Parties in Germany and Czechoslovakia.

In the third place the war losses in man-power, combined with the immediate post-war demands for reconstruction, placed a premium on labor.

The trade unions in 1919–1920, through their legislative representatives took advantage of this opportunity to put through various acts of social legislation. The demand for paid annual vacations was pressed, among other measures, and in five countries vacation laws were adopted by the end of 1920. Even in countries where there was no particular attempt to pass such laws the trade unions carried on vigorous campaigns for vacation provisions in collective agreements, and in most countries were successful in their efforts. In 1920, the vacation movement reached a peak. In the next two or three years there was some recession due to unusually depressed economic conditions. Nevertheless vacation provisions were continued in most agreements, with slightly more stringent regulations. In 1924 and 1925, under better trade conditions, provisions for paid vacations appeared for the first time in many agreements.

Finally, the movement has been influenced by a growing belief in the economic as well as the social value of annual consecutive days of rest. In general, vacations have been adopted in the post-war period only by pressure of trade unions through legislation and agreement and not by voluntary action on the part of the employers, yet many leading and progressive industrialists have come to recognize the intrinsic economic value of vacations. This has been particularly true in Germany where vacations have continued in force, although the legal eight-hour day has been abandoned. Vacations have remained not only because they are demanded as a right and privilege by the trade unions, but because many employers have come to recognize their productive value.

*British situation.* Since 1920 the vacation movement in Great Britain has been overshadowed by the unemployment situation. In two of the basic industries, coal mining and shipbuilding, a considerable amount of unemployment has been continuous, and the consideration of a further extension of leisure time would have been an insult to the intelligence of the leaders of both labor and capital. Trade unions have been occupied with demands relative to more basic conditions, such as wages and hours. Management, on the other hand, has been burdened with tremendous problems of taxation and trade, and has had little time to analyze the possible social or economic value of paid vacations. Until a general period of prosperity ensues, it is not likely that the vacation movement in Great Britain will develop on any widespread scale, but will continue to affect, as at the present time, between 16 per cent and 17 per cent of the total wage-earning population.

*Lack of development in France and Belgium.* Only two of the leading European countries, France and Belgium, have failed to adopt widely the principle of paid annual vacations. The reasons for this situation may be summarized as follows:

1. Both countries have been engaged primarily in the restoration of the areas devastated in the war. Presumably, if this situation had not been confronting these countries, there might have been a more widespread adoption of social legislation, including that granting workers' vacations.

2. In comparison with similar

groups in other European countries, the trade unions have not been effective in formulating and carrying through social legislation. As a matter of fact, the activities of the trade unions have been largely directed to maintaining the privileges already obtained through the eight-hour laws. It is said that these acts have precluded the passage of other social legislation, although this has not been the case in Austria, Poland, or Czechoslovakia.

3. The continued inflation of French and Belgian currencies since the war, while resulting in lower costs of production, has also necessitated working the full legal hours. In the minds of conservative employers, the adoption of further legislation or agreements covering vacations would be disastrous to the economic welfare of the nations. This opinion, however, appears to be refuted by the example of Italy, another country of inflated currency, but also a nation where paid vacations have been almost universally adopted by means of national collective agreements.

4. A large number of fête and religious holidays are commonly observed, and because of this fact many employers are unalterably set against any further extension of leisure time. In some parts of France as many as 16 holidays a year are granted to workers.

5. In France, the relative proportion of agricultural and industrial workers is about 60 to 40, and thus the interests of the country are still rural rather than industrial. Agricultural workers have neither the time nor the resources to get away from the farms for vacations. Most French farmers are small landed proprietors who own the land they till, and by nature and inheritance are opposed to the adoption of compulsory vacation legislation for either rural or urban laborers.

6. There has been slight appreciation of the economic value of annual vacations for workers, and in this respect the general attitude in France and Belgium is in marked contrast to that in Germany.

*Influence of industrial and economic conditions.* It has already been pointed out that annual vacations for workers have been adopted in widespread measure in all the leading industrial countries of Europe, except France and Belgium. However, it must be recalled that some of the states which have adopted legislation are primarily agricultural and not industrial. Of these nations, Soviet Russia, Poland, Finland, and Latvia may be said to be predominately agricultural, while only Austria and Czechoslovakia may be termed industrial states. Furthermore, the wage scales in these six countries have been commonly accepted as being relatively low when compared with those existing in most of the western countries of Europe. If this opinion is assumed to be correct, it may be concluded that annual vacations have been legislated primarily in countries with low wage scales. On the other hand, the question is complicated by the fact that vacations have not been legislated in France and Belgium where wage scales are also relatively low. However, other economic factors enter into the local situation of these two countries which have been engaged in primarily restoring the devastated sections.

Generally speaking, it may be said with considerable assurance that vacations have been generally adopted in countries with relatively low wage scales. At least they have not become universal in countries where the maintenance of gold standards and other economic factors have kept wages at high levels as in Great Britain, Netherlands and Switzerland.

*Vacation movement in 1925.* The year 1925 was marked by considerable agitation for the further development of the vacation movement through proposed legislation and resolutions adopted by various national and international labor organizations. A general act covering all wage earners was adopted in Czechoslovakia in April, while a similar bill was defeated in the British House of Commons in the same month. In addition, bills covering vacation legislation were drawn up in Norway and Sweden. Vacation resolutions were also adopted by various groups, such as the General Confederation of Labor in both France and Belgium; the Belgium Federation of Christian Trade Unions; the Luxemburg General Federation of Labor; the Netherlands Socialist Party, and the General Federation of Labor; the International Federation of Miners; the Universal Alliance of Diamond Workers; and the International Association for Labor Legislation. Most of the resolutions proposed legislative acts granting a paid vacation of not less than one week.

In August, 1925, it was announced that the Belgian Minister of Railways was to recommend the adoption of legislation granting six-day annual vacations to railway workers. In July, 1925, M. Durafour, at that time the French Minister of Labor, sent a bill to the Chamber of Deputies covering paid vacations to workers. The bill has not yet been reported on, presumably on account of the financial crisis in France. In August, 1925, the Social-Democrat Party in Germany reported that vacation legislation was one of the items in its immediate labor legislative program. Thus, in Great Britain, Norway, Sweden, Belgium, France, and Germany, attempts were made, in 1925, to broaden the scope of vacations either through legislation or collective agreements, while in Czechoslovakia a general vacation law was passed.

*Attitude of the International Labour Office.* The question of vacations for workers has been brought up repeatedly before various conferences of the International Labour Office and meetings of the Governing Body of that organization, although it has not actually been on the agenda of any one of the conferences. However, at the 29th Session of the Governing Body, held at Geneva, October 12 to 17, 1925, it was voted that the agenda for the 10th Session of the International Labour Conference meeting in 1927 should include discussion of annual vacations with pay. Later, at the 30th Session of the Governing Body held at Geneva in January, 1926, the question was removed from the 1927 agenda and postponed until a future date. In the meantime the International Labour Office has carried on a general study of legislation dealing with vacations for workers.[1]

*Present and future development.* In

[1] The results of this work were published in the International Labour Review, January, 1925, Vol. 11, No. 1, pp. 60–82.

the short space of seven years the annual vacation movement has become an integral part of industrialism in many of the leading countries of Europe. It is estimated that annual vacations now directly or indirectly affect a large percentage of Europe's total population of 400,000,000, inasmuch as the six states with general vacation acts have a combined population of 184,000,000; Germany and Italy, with vacations practically universally adopted in agreements, have a total population of 96,000,000, and some 25,000,000 persons are estimated to be affected in other European countries. Naturally, the whole population of these countries is not directly affected by annual vacations, but the annual vacation granted to the worker will indirectly concern the rest of his family. The working class families, in turn, compose the great bulk of the population in any country. From such estimated figures, the social and economic significance of the vacation movement throughout Europe and its poignant influence on the rest of civilization is apparent.

One striking characteristic of the vacation movement is its evident permanency. Even during the dark days of the post-war depression, there was no widespread tendency to withdraw vacation provisions in collective agreements, nor has any vacation law been nullified or restricted since adoption. In some countries it is true that the movement has been more or less stationary since 1919 and 1920; on the other hand, it has advanced rapidly in other countries since that time. It seems reasonable to suppose the next ten years will witness the adoption of some form of vacation legislation in Norway, Sweden, Denmark, Netherlands, Germany, Switzerland and Italy, and a more widespread development through collective agreements in Great Britain, France, Belgium and Spain. Such growth is dependent, in a large measure, upon general political and economic conditions, both within each country and throughout the whole of Europe. One prophecy can be made, however, with considerable assurance—wherever paid vacations may be adopted, whether by law or agreements, they will remain.

### ANNUAL VACATIONS IN INDIVIDUAL COMPANIES

Very little material concerning vacation plans in individual companies was studied, inasmuch as such plans have had slight importance in countries where vacations have been generally established under the terms of collective agreements or laws. It was not feasible to make a field survey of a large number of industrial plants in other countries, and there was no centralized source of information from which to obtain data. However, vacation plans in 22 individual companies, covering 17 different types of industries in five different nations, were analyzed. It is not known whether all of these plans were formulated independently of collective agreements. In two English firms the company vacation plans grant more liberal vacations than those given by the collective agreements.

The most outstanding characteristic of the plans is their lack of uniformity, practically all of them vary in the service requirement and the length of the vacation. The most common minimum length of service is one year,

while the length of the vacation is generally six days or one week. Half of the 22 plans grant a single period of vacation after a single period of service, while the remainder are graded plans, granting various lengths of vacation after varying periods of service. Two graded plans are especially worthy of notice; one which extends the length of the vacation to three weeks with double pay after 30 years of service, and the other which grants one-half week's vacation after three months' service. The latter plan follows the general outline of the collective agreement which the company signs.

Two plans grant additional wages during the vacation period. These companies adopted this policy so that the worker, together with his family, could get away from his ordinary surroundings. In regard to this policy, one company announced:

> It was always desired that a man should go away from home for his holiday, in order to get a thorough change, yet it appeared that in very few cases did he do so, and enquiries elicited the statement that he could not afford to go away and take the family, and that if he went away alone, he left very little money for housekeeping.

## VACATION REGULATIONS IN COLLECTIVE AGREEMENTS

Vacation provisions have been adopted in national agreements or are commonly prevailing in the majority of agreements in 30 leading industries in 16 countries. The industries were classified under the headings given in the United States Census, since this census has the most satisfactory grouping of industries available.

There was no record of collective agreements among agricultural laborers, in fact it may be said with assurance that this group has not yet been granted annual holidays except through special legislative acts. The more important industries in various countries that have adopted vacations for workers include: breweries, building construction, chemicals, clothing, glass, metals, mining, paper, printing, textiles and transportation.

In addition, collective agreements in certain countries grant vacations to municipal employes and railway workers. The latter group, in the general category of state employes, is more frequently covered by legislation.

### *Collective Agreements by Countries*

*Australia.* Vacations have been granted in leading industries through collective agreements or by intervention of the Federal Arbitration Commission. Vacations range from one to 38 days after one year of service.

*Belgium.* National agreements are confined to the wholesale fur, bookbinding and printing industries. Vacations are also granted by individual agreement in certain coöperative associations and municipalities. The prevailing length of vacation which is granted to industrial workers is one week or eight days. In municipalities, one week's vacation is granted to employes with less than a year's service and two weeks to those with over a year's service.

*Canada.* One or two weeks' vacation after one or two years' service is granted to municipal employes in various Canadian cities. Otherwise vacations are granted to industrial

workers only through vacation plans adopted in individual plants.

*Czechoslovakia.* Practically all the national agreements in Czechoslovakia grant paid annual vacations ranging from three to 21 days. These agreements, however, cover only one-third of the workers in Czechoslovakia. All workers, however, are affected by the national vacation law.

*Denmark.* A paid vacation of six days, after one year's service, is granted to about one-fifth of the total number of trade union members. The principal industries represented are food products, printing, and tobacco. State and municipal employes receive up to 14 days.

*France.* In 1923 only four out of 144 collective agreements contained vacation provisions for workers. Railroad and post office employes generally receive 12 to 15 days, and commercial employes, one week to 15 days.

*Germany.* Over 13,000,000 workers, or 92 per cent of those covered by collective agreements, receive annual vacations ranging from three to six days after one year's service.[2]

*Great Britain.* In 1925, 1,500,000 workers, or about 10 per cent of the wage-earning class received vacations through provisions in collective agreements.[3]

*Italy.* Nearly all the important industries in Italy grant a paid vacation of six days after one year's service. Practically the only industries not covered are building construction and boot and shoe manufacturing.

*Netherlands.* Over 130,000 workers, or 54 per cent of all those covered by collective agreements in 1923, received vacations of from three to 18 days. The vacation movement in recent years has been checked by trade depression.

*Norway.* In Norway in 1923, over 90 per cent of the agreements covering 97 per cent of the workers included such provisions, the most common vacation period being from eight to 12 days.

*Roumania.* Fragmentary data reveal that in industrial centers collective agreements generally contain provisions granting one week's vacation after one year's service.

*Soviet Russia.* Collective agreements generally follow the vacation provisions established in the Labor Code.

*Sweden.* Practically all of the principal industries allow a paid vacation of less than seven days to workers. Over 165,000 workers, or 77 per cent of all those covered by collective agreements, received paid vacations in 1923, the last year for which information is available.

*Switzerland.* Vacation provisions are widely adopted by agreement. Typical vacation provisions in agreements range from three days to two weeks.

*Union of South Africa.* Two weeks' vacation is generally granted after 12 months' service, in mining, building and printing, and to mechanics and electricians.

*Yugoslavia.* National agreements, granting paid vacations, ranging from four to 15 days after one year's

[2] Details affecting the duration of vacation agreements during 1920, 1921 and 1922 were given in Reichsarbeitsblatt, May 16, 1924, pp. 242-243.

[3] Details of vacation provisions in national agreements in 1924-1925 were contained in the Ministry of Labour Gazette, March, 1925, p. 76.

service, have been adopted for miners, printers, and municipal and state monopoly workers.

*Enforcement*

Generally speaking, collective agreements in European countries are well lived up to, and thus vacation provisions contained in such agreements are enforced. In fact, enforcement of vacation regulations through agreement may be as effective, or even more effective, than through legislation, since agreements are voluntarily entered into by management and labor. Laws, on the other hand, may be adopted without the approval of both parties. Thus in Italy, for example, it is said that there is no need for legislation, since the vacation provisions of the national collective agreements are faithfully executed.

ANNUAL VACATION LEGISLATION

*Classification of Legislation.* Vacation legislation is divided into two classes: (1) general acts covering wage earners or workers employed in the principal divisions of industry and commerce; and (2) special acts covering specific groups of workers. General acts are in force in six nations: namely, Austria, Czechoslovakia, Finland, Latvia, Poland, and Soviet Russia, while 19 special acts have been adopted in Austria, Czechoslovakia, Denmark, Finland, Iceland, Italy, Luxemburg, Spain, Switzerland, and the Union of South Africa.

In Austria, Czechoslovakia, and Latvia, agricultural and forestry workers, as well as domestic servants, are specifically excluded from the provisions of the general acts. In Austria, these groups are included in special acts. Seasonal workers are excluded from the Czechoslovak and Polish General Acts.

Special provisions for young people are found in the Austrian, Polish, and Russian Acts; for apprentices in the Czechoslovak Act; and for intellectual workers and workers in unhealthy and dangerous trades in the Russian Act.

The general acts have all been passed since the war; one law dates from 1919, four from 1922 and one from 1925.

The special acts cover actors, agricultural workers, bakers and confectioners, caretakers, commercial apprentices, domestic servants, miners, private employes (including shop assistants), women and young people. One act was adopted in 1909; one in 1910; four in 1919; one in 1920; seven in 1921; four in 1922; and one in 1924. Austria alone has adopted eight special acts, while two each have been adopted in Czechoslovakia, and in different cantons in Switzerland. Denmark, Finland, Iceland, Italy, Luxemburg, Spain and the Union of South Africa have adopted only one act.

*Service requirements.* Practically all legislation dealing with annual vacations requires that a worker serve a minimum, and generally continuous period of service with a given employer. The premise is that an employer should not pay for vacations unless he has already received a definite amount of service from the employe or has a guarantee of the return of the worker after the vacation season. If the worker changes his employment he generally loses his vacation rights. However, cumulative vacations, accru-

ing to the employe as he may change from employer to employer, are granted under a general act in Russia.

The majority of the general and special acts grant graded vacations, the length of vacation increasing with the length of service. Seven acts, however, give only a standard vacation after a specified period of service.

The shortest designated service period, five and one-half months, is found under the Soviet law. The most common minimum service periods are six months and one year. The longest period of service specifically named in any of the laws is found in Austrian acts covering private employes and estate workers. Under these provisions, five weeks' paid vacation is granted after 25 years of service. Practically all acts have different service requirements. Custom, competition, and economic conditions, peculiar to each of the countries involved, have made for diversity rather than uniformity.

Important considerations in determining service qualifications include absence from work on account of sickness, accident, civic duties, or military service, and interruption of the service period on account of strikes, lockouts, or termination of contracts of employment.

*Length of vacations.* In the various laws, the length of the vacation varies according to the length of service, and the class of workers involved. Here again there is no uniformity, and it is difficult to make generalizations. In the main, vacations are of one or two weeks' duration. The shortest vacation is one day for one month of service, while maximum vacations of one month or four weeks per annum are noted in the terms of the Soviet Act, in various special acts in Austria, and the Act for Commercial Assistants in Finland. The vacation generally is not increased in proportion to the length of service, as for example, one week's vacation may be given after one year's service, and two weeks after five years' service.

Longer vacations are, in some instances, granted to young persons, intellectual workers, and employes in unhealthy and dangerous trades. In general, salaried workers, such as commercial assistants, receive more liberal vacations than workers belonging to the strictly wage-earning group, such as miners, sailors, or bakers.

*Vacation season.* There are only a few vacation seasons established by law as the date is frequently fixed by the employer or by collective agreement. A few of the acts specifically designate the spring and summer months but, on the whole, considerable divergence exists as might be expected from the variety of climate, tradition, and industrial life in the different nations.

*Outside work during vacations.* The main purpose is to allow a continuous period of rest to a worker so that he may return re-invigorated to his regular task. If the worker performs any kind of work during his vacation, it is claimed that he loses the effect of the vacation and harms both himself and his employer. Nevertheless, only three countries have laws prohibiting work during the vacation season and two specifically allow the worker to take paid employment. Under the Czechoslovak and Polish General Acts and the Zurich Act covering women servants, outside work is prohibited under

penalty of the forfeiture of vacation pay. The Finnish General Act provides that the employer pay a reasonable supplementary wage to workers voluntarily working during their vacations, while actors under the Austrian Act may appear in other productions during the vacation season without the employer's permission.

*Enforcement.* The question of enforcement of vacation legislation is of paramount importance. Laws of this character cannot be made binding without the weight of public opinion behind them. Since vacation legislation is one of the most recent forms of social legislation, it is not surprising to find that the enforcement has not been an easy matter. Custom and tradition do not yet surround enforcement of these laws, and in many cases, mooted questions have not been settled by the courts.

Furthermore, general legislative acts are confined, with one exception, to new nations which arose after the close of the Great War. All of these nations have a democratic or socialistic form of government, under which enforcement of social legislation has generally been weak because attention has been directed to more basic problems. Again, some of these countries are primarily agricultural rather than industrial, and thus the relations of employer and employe have been most limited. On the other hand, in countries where collective agreements have been in existence for many years, the adoption of a vacation law has, in some ways, been a natural and logical development.

In Czechoslovakia, exactly this situation is found. For several years following the war, the majority of the important collective agreements contained vacation provisions. Both employers and workers became accustomed to paid annual vacations, and, in turn, favorable public opinion was created. The ground work was thus laid for the national vacation law enacted in 1925, and it may be presumed that in the coming years, vacation legislation will be adequately enforced in this republic.

Considerable difficulty has been encountered in practically all of the countries in regard to the interpretation of the regulations. In some places, the vacation law has not been adequately explained by the presiding officials. In other cases, as in Finland, the actual text of the law has not been clear.

Taking all of these difficulties into consideration, it may be said that, on the whole, vacation legislation has been fairly well enforced. In most countries, the enforcement of legislation has been backed by the power of the trade union organizations, which originally caused the governments to pass the law. In no country which has adopted either special or general legislative acts has there been nullification or elimination of the law; in fact in several countries, there have been liberal amendments to the original laws.

In Austria there has been considerable difficulty in connection with enforcement since 1919. In the first years after the war, when Austria was passing through a terrible period of depression, many workers used their vacation to gain double compensation, frequently going to the country to work on the farms during the vacation period. On this account many em-

ployers refused to grant legal vacations. In the last two or three years, during which conditions have improved, this practice has become less common, although it still exists to some extent.

Enforcement of the law in Austria has been particularly difficult in small shops where it has been practically impossible for the owner to allow his working force a vacation. Although the law permits shops with five workers or less to grant vacations in two separate installments, this has not been sufficient to overcome the shortage of help in small factories and shops during the vacation period. Thus, in the Labor Inspector's Reports, many small shops are reported who violate the law and who have justified the infringement of the law on the basis of economic necessity.

It is reported on reliable authority that the law is not so strictly enforced in Soviet Russia when the offender is a governmental institution, as it is when a private company is concerned. It is said that governmental factories may, through various means, delay and otherwise pervert the working of the vacation law.

The Syndicate Press reports in 1924 that the provisions of the Labor Code were strictly observed because of the fact that a large number of litigations grew out of the infringement of the law. It was reported from official quarters that in 1923 there were 15 general suits involving over 137,000 workers relative to the question of the duration of the annual vacation. About one-quarter of the decisions in these cases were in favor of the workers; two-thirds in favor of the companies, and 11 per cent were compromised. In addition, there were some 148 local suits, involving about 45,000 workers. In the first six months of 1924, official labor statistics showed that approximately 6 per cent of all the complaints filed with labor inspectors dealt with the question of annual vacations. The government, in many cases, although supposedly a government of workers itself, has rendered decisions against the workers, thus contradicting a prevailing idea that the Soviet Government is run primarily for the benefit of the working class.

*Summary.* An analysis of vacation legislation shows little uniformity or standardization in the different countries involved or in the various industrial groups covered. Wide variance exists in all vacation legislation with regard to the service requirements, the duration, the continuity, and the season of vacations, as well as to the time of the payment of vacation wages, forfeiture of vacation rights, and punitive provisions. Naturally, this situation might well be expected, due to the wide divergence in social, economic, and industrial conditions in the various countries. Practically all the legislation involved has been adopted since the close of the war, and, in the majority of cases, it has been enforced in new and struggling democracies. Vacation laws may therefore be regarded as a body of working rules rather than as a legislation in its more usual aspect. The important point is that neither elimination nor nullification has occurred since the laws were adopted.

The effect of the adoption of vacation legislation in the international labor market is evident. Practically all

countries in the eastern part of Europe, north of the Balkans, have adopted annual vacation laws, while Norway, Sweden, Germany, and Italy have adopted vacations almost universally through collective agreements. In the first two countries, it may be expected that some form of vacation legislation may be adopted within the next few years. Vacation laws already have been proposed in these two countries, and although defeated, may well be expected to be re-introduced again and again until adoption.

With more and more nations accepting the principle of vacation legislation, an attempt at international uniformity or standardization may be expected, as shown by the discussion originally scheduled on the 1927 agenda of the International Labour Council. Presumably, efforts will be made to unify provisions of the laws relating to the classification of the workers, the service requirements, and the duration of vacations. These three factors are the more important ones involved in the matter of international competition. At any rate, the amount of existing legislation may be expected to multiply rather than to decrease in ensuing years, and no one can prophesy the field over which vacation legislation may exert an influence.

## SOCIAL AND ECONOMIC INTERPRETATIONS OF THE VACATION MOVEMENT

Beyond the effect of vacations directly upon workers or industrial organizations, there are certain elements that may be considered from the standpoint of the general interests of society as a whole. The use or abuse of leisure may ultimately mean the general elevating or lowering of the standards of civilization. The moral worth of a nation depends largely on the manner in which leisure time is spent. In the early days when changes were being made in the ten- or twelve-hour working day, conservative employers frequently asserted that increased leisure might be abused by the workers and thereby become injurious to society in general. More recently, however, it has been increasingly appreciated that far-reaching social and economic values may be obtained from the proper use of leisure.

It is largely from the latter point of view that any sound analysis of the results of workers' vacations may be attempted. Certain social developments in recent years in Europe may be attributed in part to the increased number of workers who have been granted annual vacations with pay.

*Belief in the need for vacations.* One of the factors accompanying the development of the vacation movement in Europe has been the apparently general acceptance of the idea that annual periods of rest are necessary for *all* workers. Previous to the war, vacations were regarded as being requisite for "white collar" employes only, but were seldom discussed with reference to manual workers. Today, not only trade union leaders, but progressive employers and industrialists admit the value of an annual period of release from the routine and monotony of every-day employment.

This idea has been stimulated by the increasing realization that the gap which formerly existed between the intellectual worker and the industrial worker is being narrowly closed with the occupational characteristics of

modern industry. Formerly, vacations were granted to salaried employes, partly because they were "brain workers," and as such, need annual periods of rest. However, as much intellectual effort may be required of the manual workman as of the clerk or minor salaried employe, and it seems to be increasingly accepted that annual vacations are as requisite to the industrial worker as to the intellectual worker.

*Belief in the right to vacations.* In Europe, not only has there come to be a widespread belief in the *need* for annual vacations for all workers, but the *right* of workers to vacations is becoming widely asserted. Underlying the passage of vacation laws and the adoption of vacation provisions in collective agreements has been the emphasis by trade union leaders upon the *right* of workers to vacations. Formerly, this recognized *right* belonged only to the white collar class; now, according to labor leaders, the privilege must be extended to all workers. Thus, gradually the class consciousness arising from vacation privileges, which existed between the white collar class and manual workers, is being broken down. Naturally, such a development stimulates the trend to general democracy, not only in industry, but throughout all national life.

*Social results.* One of the most important social consequences of the vacation movement has been the increased amount of travel. Formerly, workers were not able to leave their home cities or villages for many years, but now with the privilege of annual vacations they have been free to travel to centers of recreation and rest. Necessarily travel has been limited by the financial means of the worker, but nevertheless, even a small journey may be of considerable social significance in the otherwise narrow and cramped life of the industrial worker. The broadening intellectual value of travel is insisted upon, and it is generally assumed that stimulation of travel because of vacations has had a beneficent social and educational effect.

The annual vacation movement has already become a considerable factor in promoting international relations since workers have been free to travel not only in their own country, but in other countries. Thus in the summer of 1925, English workers were noted traveling in Netherlands, Belgium, France, and Switzerland; Germans in Italy; Italians in Germany, and Czechoslovaks in Switzerland. Thus the vacation movement has become to some extent a factor in the promotion of international good-will.

Groups of workers have organized for their vacation trips in many countries. For many years, Lancashire and Yorkshire textile villages in England have been entirely deserted when the workers go to nearby seaside resorts during the annual "wakes." Tourists' clubs have also been founded in many English concerns, and, under the guidance of lecturers and teachers, visit historic spots in their own and foreign countries.

The Austrian Labor Inspector's Report for 1921 stated that organized excursions were being established by a prominent Vienna concern with the collaboration and encouragement of local touring associations.

Vacation clubs, founded for the

purpose of accumulating vacation funds, have been established in many English concerns. Lever Brothers, Ltd., well-known English soap manufacturers, have granted a week's holiday with pay between May and September to all workers who joined a company holiday vacation club. Workers each week have instructed the company to deduct certain sums from their weekly wages, the company repaying these sums with interest previous to the vacations. Mather & Platt, Ltd., a mechanical manufacturing firm, located in Manchester, England, established an endowed holiday fund to which employes are eligible under certain conditions.

Vacation grounds and club-houses, in some cases, have been established by industrial companies. In Switzerland a large metal concern acquired a club-house on the border of the Lake of Four Cantons which they converted into a vacation colony for workers needing rest. Another Swiss concern in the textile industry has established a vacation fund for the workers' children.

It has been quite impossible to ascertain on the basis of available data the effect of the vacation movement upon the increase or decrease of alcoholism. In most countries, at least, there has seemed to be no general lowering of social hygiene as a direct result of the vacation movement. Many countries have passed legislation restricting drinking hours and the sale of alcoholic stimulants.

Since the war there has been a widespread development of general education among the working classes of Europe. Although no detailed data are available, there is much evidence that annual vacations have been a factor in the growth of school and college technical classes for workers, extension, evening, and Sunday lectures, public libraries, Young Men's Christian Associations, Young Women's Christian Associations, women's institutes, community halls, exhibitions, singing societies, literary clubs, and trade and coöperation associations.

In Austria, the Labor Inspector's Report for 1919 suggested the creation of national vacation homes for workmen. The purpose of these homes was to receive workers during the annual paid vacations for educational and recreational purposes. In a similar report in 1920, two communications from the Boards and Factory Enterprise revealed that a weekly reservation of 1 per cent to 2 per cent was set aside for vacation homes in the country. To quote from the report:[4]

> These communications show that the workers desire to make suitable use of their vacations and that the largest concerns through their own means, and the smallest by collaboration and committee action can insure the establishment of installations permitting the workers to provide for their rest requirements during vacation time.

*Physical effects.* One of the main factors in the development of the vacation movement has been the desire for physical rest and recreation during an annual period of rest.

It has been generally accepted that vacations break the monotony of a job and provide a period of relief to the intensity of the daily routine which gives the employe new vigor and

[4] Labor Inspector's Report, Vienna, 1920, p. 118.

energy. This opinion has been expressed in many different countries by employers as well as employes and trade union leaders. This situation has been particularly true in recent years in Germany where annual vacation provisions have been retained in collective agreements, although daily hours of work have lengthened. The German employers have come to realize the necessity of an annual period of rest in order to gain the maximum production from their employes.

An interesting example of the granting of annual vacations as a health measure has been shown in the diamond-cutting and polishing industry in Amsterdam. Management in this industry came to believe that a week's vacation was absolutely necessary for the health of the workers, primarily on account of the eye-strain involved in diamond cutting and polishing. From the workers' standpoint, the physical advantages of a vacation are hardly to be questioned. Many employers, on the other hand, feel that vacations are justified only as they can be proved to be of economic as well as social value.

*Economic considerations.* In most countries, vacation plans have generally remained where they have once been adopted, either in individual companies or in collective agreements. Depressed trade conditions may have checked the advancement of the vacation movement, but have not vitally affected vacations after they have once been adopted. General legislation in Austria went into effect in 1919, shortly before an extended period of trade depression. The Austrian Labor Inspector's Reports, for the years 1919 and 1921, revealed the fact that during the depression many workers took outside work during the period of vacations and thus received double compensation for the vacation period. The 1919 report says:

> Many workers do not appreciate the full value of the vacation measure. They voluntarily renounced their vacation against remuneration, or accepted work in other establishments during their vacation period, and under much inferior conditions, so that they resumed their work more fatigued than at the time of their departure. The reason for this seems to rest less in indifference with regard to social policies than in the distress experienced by the population which will make use of any opportunity to increase its income.

In Switzerland, the growth of the vacation movement was seriously checked during the economic depression in post-war years, and, in some cases, individual employers discontinued vacation plans that had already been adopted.

*Absenteeism and labor turnover.* In some cases, chiefly in the plans of individual companies, the granting of vacations is directly dependent on attendance. One example of this is in an English concern which granted a week's vacation to every man who had less than ten days' unexcused absence in the preceding year. In the first year of the plan's operation, 1884, only 42 per cent of the men qualified for the vacation. In the succeeding years, the amount of unexcused absence on which the qualification for vacation was based has been steadily reduced by the company, while the percentage of men qualifying has constantly increased. In the last year for which records are available (1925), 99 per cent of the employes qualified

for vacations in this company, *although men with more than two days of unexcused absence lost the vacation privileges.*

In Italy the development of annual vacations has continued during the régime of the Fascist Party. Today, practically all the important national agreements in Italy grant six day's vacation after one year's service. It may be well presumed that the continuance of these vacations by agreement would not have taken place unless sound economic results were apparent.

In Austria vacations were not granted in the building trade, unless a worker has been employed at least 52 times a minimum of 35 hours, with or without interruption, during a period of 16 consecutive months. Such provisions unquestionably have had the effect of reducing labor turnover in such a seasonal industry. At least, annual vacations would appear to have had a settling influence on seasonal fluctuations in such industries.

In Norway, in 1924, vacation allowances and collective agreements were estimated on the basis of the worker's regular hourly wages, multiplied by the number of hours of employment.

The above examples thus reveal the favorable influence of vacations on continuous service, attendance, and punctuality.

*Relation to production.* The investigation in various European factories revealed mixed opinion regarding the value of annual vacations in relation to production. Most opinions were biased by the social or economic point of view of the person interviewed and did not reflect real consideration of the question at issue. Thus conservative employers were generally opposed to vacations, while trade union leaders quite naturally were strong supporters of the vacation movement. In one company operating in Germany and Sweden, both the general manager and his assistant declared that vacations were economically unsound on account of the loss of production during the vacation season. On the other hand, a local plant manager in the same company said that the production loss during vacations was more than made up by the increase in the health and morale of the men and that the company could not afford to operate without vacations.

In Germany, a representative of an employers' association was violently opposed to annual vacations because he believed that they caused decreased production. On the other hand, officials in one of the largest industrial plants in Germany stated that annual vacations had proven a direct stimulus to production.

The causes of increased or decreased production are so varied that it has been practically impossible to isolate the influence of vacations. The prevailing opinion among European executives, unsubstantiated by concrete data, would seem to indicate that the direct incentive value of vacations toward increased production reaches the peak when vacations are granted in individual or more or less isolated instances, and that this effect may be diminished as vacations become general by legislation or by collective agreement. Against this appraisal of economic values there must be weighed the increase in social values affecting health, education, and morale.

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# Tests for Taxicab Drivers

By David Wechsler, *The Psychological Corporation, New York*

*The day is coming when tests for carefulness in operating an automobile will be widely used as part of the examination required of all professional chauffeurs. Dr. Wechsler here reports an experiment with tests of carefulness, of reaction time and of mental alertness, which he correlates with accident records, earnings and supervisors' ratings. The carefulness test proved to be the most effective.*

THIS paper represents some results showing the value of certain psychological tests in eliminating the unsafe and incompetent taxicab driver. The results are based upon an investigation made at a large cab company in Pittsburgh, where the psychological tests to be described were installed. The investigation was made over the period April 22 to June 15, 1925, and omitting the first week which was devoted to the installation of the apparatus, covered a period of six weeks of intensive testing. Over 250 men were examined and their scores compared with their records, as shown in the files of the company. On the basis of the results obtained, norms and standards were devised to serve the company as a basis for the selection of more efficient and safer drivers and also to reduce the cost of operation. The psychological tests proposed to do this by:

1. Selection of men who would have fewer accidents.
2. Selection of men who would earn more money for the company.
3. Reduction of labor turnover.

## DESCRIPTION OF TESTS

In order to accomplish this a series of tests was drawn up. They were designed to measure those traits and abilities apparently necessary for a safe and efficient driver, and to be administered in the most economical way consistent with scientific demands. Two tests were selected: a written or paper test which could be given to as large a group as desired, and a practical test to be given individually.

*Written or group test It.* This part of the examination consists of a series of psychological tests measuring mental alertness and general intelligence. It is a compilation of material taken from standard tests in this field. The tests[1] were selected on the basis of their high correlation with the traits intended to be measured and their suitability for the type of subjects on whom they were to be used. Thirty minutes is required for this part of the examination.

[1] The tests include a learning test (digit-symbol), an arithmetical reasoning test and a picture completion test.

*Reaction time and carefulness test, or individual test D and De.* This test is intended to measure the driver's alertness of attention, quickness of reaction under distracting stimuli and above all, his carefulness. The following is a description of the test as given: The subject is seated in a dummy car which resembles an ordinary cab. He is instructed to look straight in front of him at a gray board ten feet from where he is seated, upon which intermittent lights of different colors are flashed at irregular intervals. When seated in the car he is told to take the position for ordinary driving, that is, his left foot to the left of the clutch, his right foot on the accelerator, and his hands on the steering wheel. He is told to imagine that he is driving along at ordinary speed, and that in no case is he to press down upon the gas which is already being fed at the proper rate. However, upon the flash of certain lights, which serve as signals, he must

FIG. 1. DUMMY CAR AND FLASH BOARD FOR TESTING DRIVERS' CAREFULNESS AND SPEED OF REACTION

react in certain ways by an appropriate movement of the hands or feet, or both. For instance—at the flashing of a yellow light (meaning to slow up) he must come down upon the clutch and foot brake. After each movement or response he is told always to come back to his original position, but in doing so he must not come down hard upon the accelerator. If he does this a mistake is registered.

The apparatus is so devised that the signal lights are flashed automatically and remain lighted for a definite short interval of time. In order to be credited with a correct response the subject must react with the appropriate movements within that given interval of time. If he makes incorrect movements or reacts too slowly this response is not registered. On the other hand, if he is not careful and in his excitement strikes the accelerator, his mistake is registered automatically on an electric counter. The number of correct responses gives an index of his alertness and speed of reaction; the number of errors, a measure of his carelessness. Throughout the test the subject's responses and reactions are automatically recorded on electric counters which total each type of response separately. All that is necessary at the end of a test is to read off the figures from the several electric counters. The duration of this test is fifteen minutes.

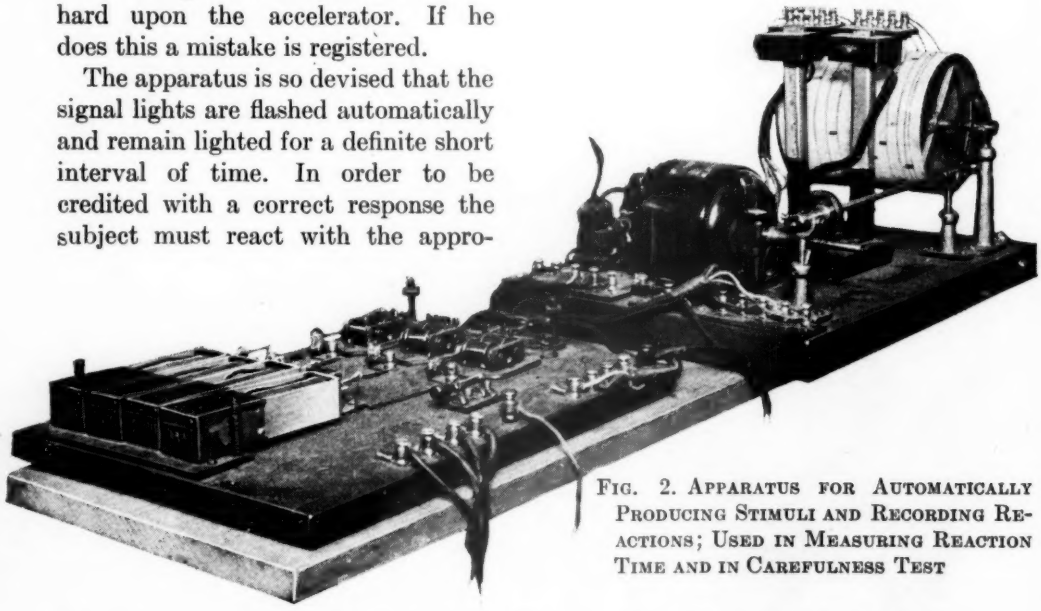

FIG. 2. APPARATUS FOR AUTOMATICALLY PRODUCING STIMULI AND RECORDING REACTIONS; USED IN MEASURING REACTION TIME AND IN CAREFULNESS TEST

### RESULTS

In order to determine the value of the tests it was necessary to correlate the results with established criteria. The standards used were the records the men had established for themselves as shown by the files of the company. The facts taken into consideration were such items as the number of merits received over the given period, the number of accidents during the same period, average daily revenue, revenue per cab-mile, etc. In the analysis of our results we made use only of the scores of the "old" men or such samples of them for which we had sufficiently complete records, in order to make valid comparisons.

The following principal results revealed by the analysis of our data are arranged in such a manner as to show how and to what extent the tests are effective in accomplishing their purpose.

*1. Test results and accident records*

The *De* test is most effective in picking out the men having the fewest number of accidents from those having the greatest number of accidents. It forms part of the individual examination in which the subject is required to react as quickly as possible to stimuli without making mistakes. The careful men are those who make few or no errors, the careless men are those who make a considerable number of errors, the degree being measured by the number of wrong reactions. Setting the failing score at 5 errors we calculated the average number of accidents per man of those failing as against those passing and found the following results:

| | *Test De* |
|---|---|
| Accidents per man for those *passing* on test | 1.3 |
| Accidents per man for those *failing* on test | 3.0 |

These figures show that those who failed on the test averaged more than two accidents to every one that was reported against those making the passing score.

The relation between frequency of accidents and scores on the test is further brought out by figure 3. Here men have been classified into three groups: those making 0 errors, those making 1 to 3 errors and those making 4 or more errors, and the percentage of men having no accidents recorded against them over the period considered.

Similar results are revealed by comparing the men's scores with their superintendents' ratings. Several superintendents were asked to rate their men on carefulness and safety in driving, by giving the rating 1 to those whom they considered to be the safest and most careful drivers, 2 to those who were not so careful but were still considered reliable, 3 to those of barely average safety or inclined toward

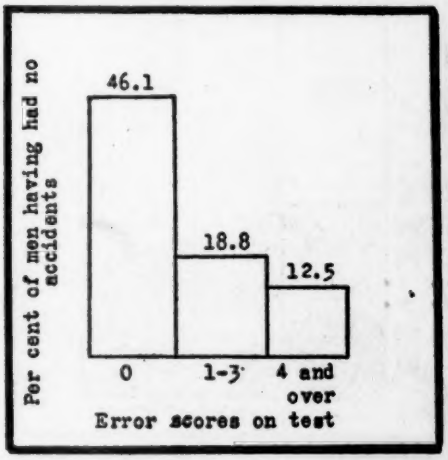


FIG. 3. FREQUENCY OF ACCIDENTS IN RELATION TO SCORES ON TEST *De* (35 CASES CONSIDERED)

recklessness. The relation between the superintendents' ratings of the men and their performance on the test is shown by figure 4. This figure shows also that there is a good correlation between the superintendents' ratings of the drivers as to safety in driving and their performance on the test. The men who were rated high generally made the best scores, while those who were rated low made, on the whole, the poorest scores.

The figures on the relation between

speed in reaction to distracting stimuli and frequency of accidents are interesting because they show some unexpected results. Our expectation was that the men with the greatest number of accidents would have the slowest reaction times. In this the results of the test bear us out. But in addition they also reveal the interesting fact that those who had the fastest

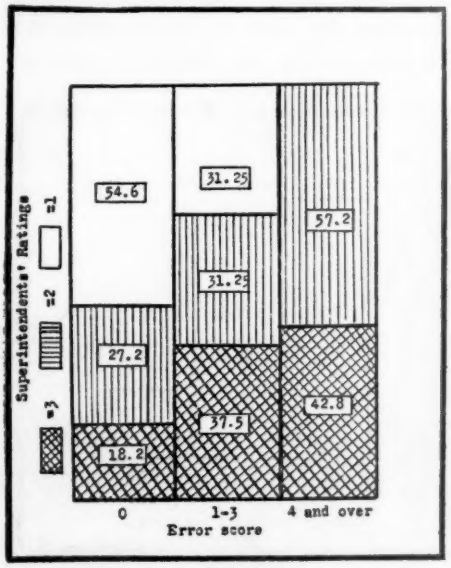


FIG. 4. RELATION BETWEEN SUPERINTENDENTS' RATINGS AND DISTRIBUTION OF SCORES, TEST *De* (35 CASES CONSIDERED)

reaction times also had a great number of accidents, as shown in figure 5. This result, however, is not to be interpreted to mean that a very quick reaction is a handicap to driving, but that men who are very quick are liable to take chances because of over-confidence, and thus risk accidents.

### *2. How tests indicate degrees of efficiency*

One of the most important measures of a chauffeur's efficiency, so far as the company is concerned, is his earning capacity. How much revenue does a man bring in? The company was therefore, particularly interested to know how the men's performances on the tests compared or correlated with their earning records. We first compared the men's records as to average daily revenue with their scores on the general intelligence or group test, *It.* In general we found that men having higher scores on this test also tended to have greater daily revenue, but this

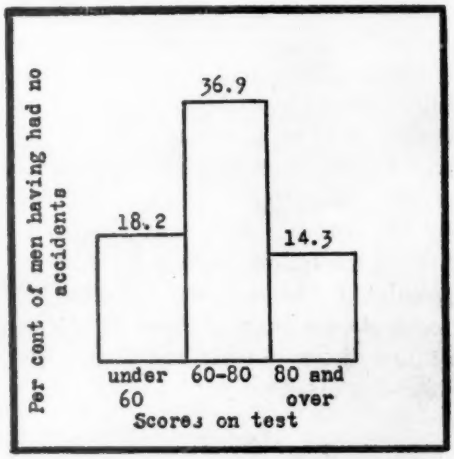


FIG. 5. ACCIDENTS IN RELATION TO SCORES ON TEST *D* (35 CASES CONSIDERED)

was true only up to a certain point. When we came to the men making the highest scores, their revenues, instead of continuing to rise, began to fall off. The poorest earners were relatively most frequent among those making the highest scores, as well as among those making the lowest scores. This can be seen from the following table where we have calculated the percentage of men for each group turning in less than a certain amount of daily revenue. The amount taken is $12.00 which is approximately one dollar below the average daily revenue

of the group examined as a whole. The groups labelled "under 35" and "70 and over" represent, respectively, the men making approximately the lowest and highest 10 per cent of the scores on the intelligence test.

*Relation between low average daily revenue and scores on Test It*

| SCORES ON TEST | UNDER 35 | 35 TO 60 | 70 AND OVER |
|---|---|---|---|
| | *per cent* | *per cent* | *per cent* |
| Per cent of men averaging less than $12.00 per day..... | 50 | 35 | 45 |

These figures show that there is such a thing as being too bright as well as too dull for the job of chauffeur. This is not because intelligence is a handicap to driving a taxi but because a man of superior intelligence who takes to cabbing as a profession is likely to have some special limitations.

More important than a man's daily revenue average, as a measure of efficiency, is what the company terms "average revenue per cab-mile." This item not only takes into consideration the average revenue a man has been able to earn, but also the mileage he has had to drive or cruise in order to make that amount, and indirectly, his gas consumption as well as wear and tear on the car. The average daily revenue of the average driver among the men examined is approximately 20.5 cents per cab-mile. Eighteen cents per cab-mile thus represents a significantly low figure and a correspondingly inefficient driver. Figure 6 shows the percentage of such inefficient drivers among the tested men, in relation to their test scores.

For easy comparison the men have been divided into three equal groups, each representing one-third of the total (135). The lowest third is included by the scores labeled "under 50," the middle third by the scores "50–60," and the highest third by the scores "60 and over." Results show that there were more than two inefficient drivers among the men making the low scores, to every one among those making the high scores. (See fig. 6.)

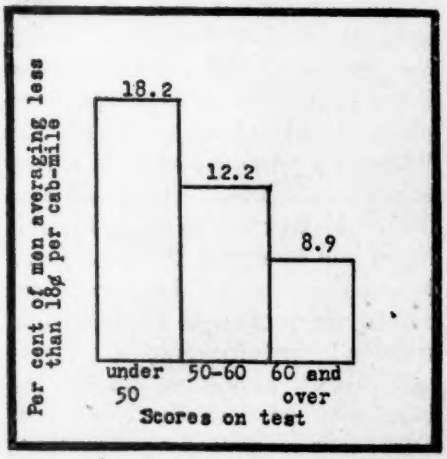


FIG. 6. AVERAGE EARNING PER CAB-MILE IN RELATION TO SCORES ON TEST *It* (135 CASES CONSIDERED)

### *3. How tests will reduce labor turnover*

The third object of the tests, and one of the most important to the company, is the reduction of labor turnover. In order to demonstrate that the tests can effect this, a sufficient length of time must be allowed so as to enable us to compare the labor turnover of the company after the introduction of the tests with what it was before. This time has not yet elapsed, but on the basis of results obtained by other companies with similar intelligence tests we may

confidently expect that labor turnover will be greatly reduced.

It is probable that the test will do this by weeding out at the start those too dull to make good on the job who would soon leave or be fired, and by singling out those too bright for the job who would probably leave either because of lack of incentive or because they take the position merely as a temporary stopgap.

## SUMMARY AND CONCLUSIONS

Summarizing our work up to the point to which it has been carried, the analysis of the results obtained shows that the tests have proved themselves capable of accomplishing the things they proposed to do in a very satisfactory manner. They are capable of picking out to a considerable degree the safe from the unsafe and the efficient from the inefficient drivers, and promise to be effective in reducing labor turnover.

The most important results are those obtained with the carefulness tests. It is generally agreed by those who have investigated the problem of accidents in a first-hand way that the greatest single causative factor is carelessness. The carefulness test described seems to be capable of picking out very specifically the careless individual. As far as we know, this is the first time that such a test has been effectively employed.

In this paper we have made no reference to previous studies in the same field, as it was our purpose to limit our report to the presentation of the results obtained from our own investigation. Encouraging results from previous studies, however, have been reported, notably by Snow[2] at Chicago and Moss[3] at Washington. From the point of view of numbers the studies on the effectiveness of tests in the selection of automobile drivers have been fewer, so far, than those made on motormen.[4] This will probably not long continue to be the case for the ever increasing number of accidents and the congestion of the public highways by the automobile is beginning to receive much attention both here and abroad. In our own country the National Research Council has been investigating the problem for the past year. Reports of results of some of the sub-committees will probably be available in the near future.

[2] Snow, A. J.: Psychology in Business Relations. Chicago: A. W. Shaw Co., 1925. Chap. 30.

Snow, A. J.: Tests for Chauffeurs. Industrial Psychology, Vol. 1, No. 1, January, 1926, pp. 30–45.

[3] Moss, F. A.: Standardized Tests for Automobile Drivers. Public Personnel Studies, Vol. 3, No. 5, May, 1925, pp. 147–165.

[4] Viteles, M. S.: Selection of Motormen. Jour. of Personnel Research, Vol. 4, Nos. 4–5, 1925, pp. 100–115; 173–199.

Shellow, Sadie Myers: Selection of Motormen in Milwaukee. Jour. of Personnel Research, Vol. 4, No. 6, October, 1925, pp. 222–237.

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# Individualizing Education in the Wharton School

By Rex B. Hersey, *University of Pennsylvania*

*Fitting the educational activities more closely to the individual needs, ambitions and difficulties of the students is a function of the personnel department in a representative school. In this work a broad horizon lies ahead. The description here presented states the growth of the plan, its scope, relation to cultural and vocational ideals and division into its component parts.*

THE next great step in higher education must be individualized student instruction and development. Practically every university is considering methods of solving this problem. Most of them have started at the top and are working down. Following industrial personnel practice, they have established plant or university personnel departments which look upon the various undergraduate schools as merely departments of the plant. There is a different method of attacking the problem; that of starting with the school as the basis and working up to the functions of the university.[1]

[1] The school described, the Wharton School of Finance and Commerce, was established in 1881 as the undergraduate School of Business of the University of Pennsylvania. At the present time it numbers 2671 students and has a faculty of 150 members teaching the following subjects: Economics, Sociology, Political Science, Finance, Business Law, Real Estate, Insurance, Commerce, Transportation, Accounting, Geography, Industry and Merchandising.

The proposal here to be evaluated is, then, the introduction of a personnel department in a *school* of a great university. In discussing this problem the following topics will be considered:

A. History of the evolution of special machinery to give personal advice and assistance to individual students of the Wharton School.
B. Purpose of the School as a special consideration in college personnel work.
C. Statement of the general problem to be solved if education is to be individualized.
D. Conclusions and suggestions concerning the organization of a department of college personnel in any undergraduate school of a large university, with chief attention paid to Wharton plans for the future.

## A. History

It is a recognized principle of industrial personnel practice that a new personnel device should not be introduced except to solve a pressing managerial problem dealing with human relations, or to satisfy an expressed

want of the workers. Are there expressed wants or pressing managerial problems which seem to demand an expenditure of energy and funds on personnel work in the college sphere? An example of the situation which first satisfied both of those prerequisites in the history of the Wharton School is:

*Case Number 1.* Young man of twenty-two years of age, member of this year's graduating class; specialized in finance; wants a job in his field of interest at a fair starting salary and with reasonable opportunity for advancement. Can the members of the regular teaching staff aid this young senior to solve efficiently this, his most pressing problem?

For some time before 1920, it is true, several members of the faculty had been helping scattered individual cases find employment whenever possible. But the results were proving satisfactory to neither professors nor students. A natural consequence was the establishment of the Industrial Service Department of the Wharton School in January, 1920; in order that all the work of placement and vocational guidance could be coördinated under one head and thus developed more comprehensively and effectively.

### *Functions of industrial service department*

At the time of the establishment of the department, Dr. Emory R. Johnson, Dean of the Wharton School, had in mind the following purposes:

A. The study and analysis of the vocational fitness of all students through
   1. Personal interviews
   2. Judgments of members of the faculty best qualified to pass on each case
   3. The development of such tests as might be found practicable and might in combination with the above information lead to a definite scientific basis of vocational guidance

B. Assistance to members of each graduating class in securing employment through
   1. The establishment of such connections with individual business houses and business associations that their needs for college men might be adequately known and progressively developed for Wharton School graduates
   2. A definite survey of opportunities, especially starting opportunities in the fields of business and public service in which Wharton School graduates might be interested and for which they might be qualified

C. Maintenance of contacts with graduates, to the end that information as to each man's subsequent business record should be available, particularly for the purpose of improving vocational guidance work and assisting the Curriculum Committee in its work; also, to keep alive the interest of the alumni. As a part of this contact work with graduates the Employment Service was to be extended to them also. The proposed methods of accomplishing this follow-up work were by means of:
   1. Questionnaires sent to graduates
   2. Personal interviews
   3. Letters of inquiry to employers

### *Development of methods*

The new department was placed in charge of Professor A. H. Williams. He began his work with interviewing and assisting the seniors.

Gradually the interviews were extended to include both juniors and seniors. As the work of the department gradually became more detailed and as visits to employers became more burdensome, it was found necessary to add Assistant Professor W. R. Hockenberry, also on a half-time basis. The next step was the working out and introduction of a tentative rating scale by means of which the faculty could rate students of the various classes and thus place their collective appraisal of the students at the disposal of the interviewer.

An attempt was also made, in collaboration with the Department of Psychology, to devise a series of tests which might give the department objective and quantitative determinants of the vocational qualifications of the various students. This effort still awaits further research and development before becoming of certain value.

*Follow-up activities*

As part of the follow-up work, it became, in addition to its alumni employment service, a regular function of the department to send out to the alumni an annual letter covering developments of educational interest in the school. It was not until March, 1924, however, that any comprehensive attempt was made to use the follow-up work as a scientific aid to placement. At that time, an alumni record sheet was mailed to each graduate. Approximately seven hundred returns were made, or 25 per cent of the total alumni body. Additional efforts since that time have brought in others until the department now has reasonably complete information on 30 per cent of the alumni. On the basis of this information the graduates were classified according to kinds of work and an analysis was made of the experience of those in common fields. Likewise, information concerning earnings by fields was compiled. These classifications have been of assistance in enabling the department to secure possible applicants for openings in specified lines when requests come from employers and in giving information to undergraduates who contemplate choosing such work. On this latter point, care has been taken, however, to emphasize that the present records are still quite scanty and may not form a sufficiently broad basis for decision concerning probable advancement in any given occupation. In view of the rather high incomes of the men who furnish returns, it is believed that the tendency is for only the most successful to give the story of their business careers. This work, however, lays the basis for what seems to be lucrative research from the standpoint of vocational guidance and curriculum building.

*Other problems cause reorganization*

But in the meantime other student problems, long vaguely recognized were becoming articulate, and their importance more keenly felt, as the Wharton School increased in numbers and as the Industrial Service Department became more and more the confidant of the individual students. Furthermore, it had become obvious that not merely the *present* qualifications and interests of the student were important in placement work, but that they could often be fully understood

only in the light of the student's past history. How varied the problems were and how impossible it was for the Industrial Service Department, organized as it was at that time, to care for them along with its routine work of placement can be seen from the following representative cases:

*Case Number 2.* Boy 19 years of age. Leader in his high school, class officer, captain of foot ball team. Had aspirations to study dentistry or pharmacy. Could not qualify because of the language requirement in the pre-dental course. Rather than give up a college education, he enrolled in the Wharton School. Result—after only a few weeks he finds he is mis-fit, is dissatisfied with everything, work not going satisfactorily, but nevertheless is trying to make the foot ball team and working week ends to earn enough to carry on.

*Case Number 3.* Boy 21 years of age. Attractive type; no outward evidence of strong character, but the facts are as follows: At the age of 18 started to teach school in one of the toughest rural schools in Pennsylvania. Many of his scholars were only two years younger than himself. Taught for three years and during the last year was the highest paid teacher in this up-state county. Worked in a construction gang in the summer and at last saved $600 with which he entered the university. If there is such a thing as over 100 per cent enthusiasm for college training and the University of Pennsylvania this boy has it. His only fear is that he will be unable to finance his way. Now he is working a few hours each day in a fraternity, but is gradually using up his capital.

*Case Number 4.* Boy 20 years of age. Strong personality and with a very definite aim and ambition. No financial problem in this case. Father not a college man, but has built up a very large organization in a manufacturing industry. Boy has made a study of the needs of the business, has watched its growth since he was old enough to take an interest. Desires proper guidance in his course so that he will take no wasted steps in qualifying himself both in business facts and an all-round education for the extension of a business which he firmly believes to be an asset to the community.

*Case Number 5.* Boy of 17. Apparently very quick and bright, but unable to maintain a passing standard in most of his freshman work. Investigation showed him to be the product of a lax and easy-going high school, in which the standards were low and the students were never compelled to study in a serious fashion.

*Case Number 6.* Boy of 22. Now in his junior year with an 85 per cent average in his freshman and sophomore years, but in danger of being thrown out of school. Professes to be interested in his school work, but to have unconsciously allowed his interest to be directed more and more to extra-curricular activities, such as the college paper and too many shows.

*Case Number 7.* Boy of 19. In his sophomore year, after obtaining an average grade of 75 per cent in his freshman subjects. He became so morbid during the past year that he was constantly belittling himself and finally attempted to commit suicide. Had the feeling that his professors were entirely against him.

### *Formation of department of student personnel*

These cases and others like them could be multiplied indefinitely. In fact, there is practically no student, especially in his first two years at college, who does not at some time or other need a properly sympathetic hearer and sound advice, based on a personal knowledge of the student, his past history and his probable future. Merely a few of the more important type cases have been given in order to illustrate the need for an extension of some sort of machinery to take care of these students and give them such expert advice as the individual pro-

fessor, over-burdened with work and research, is unable to give.

It is true that the Registrar, aided by the Secretary of the Faculty, has for some years had the task of interviewing and advising deficient students, while the Executive Committee dealt with the cases of those who failed in 30 per cent or more of their work—those who became scholastically deficient. Still other professors, as in the case of the placement problem already mentioned, were voluntarily giving advice to students as opportunity and open necessity arose. The method of assigning students to a so-called faculty adviser had also been tried, but without definite success.

One must also give credit to the excellent work carried on by the religious organizations on the campus: The student pastors, the International Students' House, the Christian Association. They were and are still of great service, but they do not supply the personal touch with the School that is so necessary.

After a year of investigation and discussion, it was decided in the Summer of 1925 to combine all the various agencies, dealing with the students' personal problems, as they were related to the Wharton School, into one department—the Department of Student Personnel—under the direction of Mr. Thomas A. Budd. He was to be assisted by Mr. W. R. Hockenberry who took full charge of the placement work, while Mr. A. K. Henry assisted Mr. Budd in the phase of the department's work which is definitely related to the problem of helping the students to find themselves and to develop their interests.

*Present department of student personnel*

The present functional organization of the department is three-fold: The personnel division, the placement division and the follow-up division. The purpose and methods of the placement and follow-up divisions as they were first organized by Dean Johnson have already been outlined. Their work has proceeded to a large extent in accordance with his wishes. Though his ideal remains unfulfilled in many respects, it seems likely that it is only a matter of time until his original plan is not only accomplished, but must be exceeded in the light of new problems that are always arising. The personnel division of the Department of Student Personnel, though in existence only seven months, has, as can be seen from the representative cases, an extremely varied list of human problems to solve.

*Place of records*

With such difficult problems to solve, complete statistical information regarding the students' status and activities must be available to assist both personnel and placement divisions. Mr. Budd has thus excellently summarized the records desired of each student:

> The record begins with the preparatory school record of the student. This includes not only his scholastic record, but also his record of non-scholastic activities, his health, and the personal estimate of his teachers. Thus, before the student registers for his freshman year the Director of Student Personnel is able to determine whether there are any outstanding facts concerning him. If he has had a poor health record or if he has been forced to finance himself in whole or in part, his class hours

for the first year may be reduced in order that he may not begin his college career under a handicap.

When he appears at the university he is interviewed and is asked to file complete information concerning his objective and how he hopes to attain it. He is also asked to file a complete statement concerning his personal status. From the beginning of his college course his record is built up month by month and year by year until his course is completed. This record shows his standing scholastically and also the opinion of his instructors concerning the manner of his dress, his poise, his aptitude, his reaction toward criticism, and other important factors. Since this information is obtained from some twenty or twenty-five instructors over a period of four years a very clear estimate is obtained. The problem of recommendation to business organizations thus becomes a more simple matter than usual and business men are brought to conceive of the service as a responsible one.

### *Student and faculty coöperation necessary*

But the work of the Personnel division is not alone concerned with assistance to individual students. It is just as necessary that it receive the cooperation of the students as a group and of every individual member of the faculty. Otherwise its contacts with the students and the interviews will not be characterized by that spirit of mutual confidence and trust which is absolutely essential, if such intimate work is to be a success. The building of this mutual trust is not to be accomplished through a sales campaign; it is rather, in the case of both students and faculty, a matter of slow and careful education of both parties, of a long record of sound advice and fair play, of real, intelligent sympathy and interest in each individual case.

It is not merely a case, however, of getting students and faculty to know about the purposes and work of the department and passively approve. Their active support must be enlisted and their true opinion known. To make this the more possible, the Director of Student Personnel is assisted by both a Faculty and a Student Advisory Committee. The Faculty Committee is composed of one representative from each department; the Student Committee is picked from Wharton students in the various representative student organizations: Sphinx, Friars, Interfraternity Council, Christian Association, Pennsylvanian, Dormitory Senior Advisers, Undergraduate Council, Menorah Society, Newman Club, and each of the various classes, in all thirteen members. At present the two committees meet separately and, when need arises, jointly.

### *Student committee similar to shop committee*

The time is not ripe to judge the value of the committees. One can only say that there is a definite desire on both sides for their continuance. We face the same problem, however, that is faced in industry by the shop committee system. The student committee will never become a truly active body unless its wishes are heeded, unless it has more than merely advisory powers. The Wharton School, as is the case with all colleges, has many in its faculty who are quite willing to be considerate of the students as individuals, but hesitate to admit their right or ability as a group to play an important part in the curricular, administrative or disciplinary affairs

of the college. In the smaller college, where the voice of the individual can be effectively heard, this position may be justified. In the larger college, the contact between the professor of authority and the individual students is not close enough for the opinion of the individual student to count for much. Usually dissatisfaction expresses itself merely as a vague, subterranean rumbling, which may never reach the ears of the faculty, but often causes a lack of loyalty in certain alumni that the uninitiated find hard to understand.

*Problem of selection*

So far this discussion has kept away from one very important question, the matter of selection for admission. That is because the question of mental qualifications for entrance is in charge of the University Director of Admissions.

A modified form of the Alpha test for mental alertness has for several years been given to those candidates whose qualifications are not first class. However, no statistical study of the correlation between scholastic grades and test records has been made. Beginning with June, 1926, the scholastic aptitude test as given by the College Entrance Examination Board will be used, the requirements for exemption raised, and the correlation between grades and test records more carefully observed. In view of the fact that over half of the units taken by Wharton men are in cultural, non-vocational subjects, it seems logical that the work of selection for admission should be a university function. Further possible duties of the university in regard to personnel work will be noted in the last part of this article.

Such is the present status of the Department of Student Personnel in the Wharton School, when considered purely from an objective standpoint. However, careful observation and long discussion with various professors and interested students have led to the tentative conclusion that the ultimate success or failure of any Department of Student Personnel is definitely a function of the closeness with which it fits into, and is an adjunct of, the general purpose of the school.

B. PURPOSE

Every college has some sort of an ideal goal of culture and knowledge which it hopes its students will both consciously and unconsciously adopt as their own. This goal includes a technique, a content and an atmosphere. In its fundamentals, the technique of investigation and learning is everywhere a constant. The content, even in the smallest college, varies with the major the student has chosen. In the larger university we find that each separate college tends to develop an atmosphere—a philosophical attitude toward life in keeping with its own peculiar problems and purposes. Thus we have often a struggle arising between the various colleges in the same university as to what are the most valuable assets in life. The work of a student personnel department is rendered unduly difficult from its inception, if it attempts to solve the personal problems of too many students who view life from divergent angles, especially when these points of view are inspired by the

differing philosophies and purposes of their respective colleges. This factor becomes particularly obvious when it is recalled that the Wharton School alone has 2500 students.

The personnel work of the Wharton School thus must embrace somewhat different functions from that of the purely Arts and Sciences College or the Engineering School. The difference is based on a dissimilarity in the goals. The Undergraduate Business School has a reason for existence which is peculiar to itself. It is the protagonist of a new culture, a new philosophy of life in tune with the advancing spirit of democracy. It was conceived and is nurtured by the need of a large class of young men for a different technique to meet the increasing complexity of modern industrial life. As such it is a late adaptation in education to assist youth to play its rôle more creditably in the Great Society. Though some may conceive the function of a business school, and consequently the Wharton School, to be chiefly a means of training men for money making, its fundamental purpose is to train the individual for the most pressing social needs and as such is intrinsically fine in its social implication. Its essence for the individual is that ability to produce as well as to enjoy must constitute the culture of the future.

In translating this general philosophy into definite standards, the Wharton School suggests for its students the following requirements, the first two of which unfortunately cannot be put into definitely measurable form:

1. A stimulus toward the proper cultural ideal
2. A well developed sense of social obligation
3. A standard of knowledge
   a. A coördinated conception of general business ethics and principles
   b. Fitness to enter some special field of business activity on graduation
4. Technique of the scientific method of acquiring knowledge and of arriving at solutions of problems

These requirements, together with those imposed by his daily relationships with life about him, constitute the environment to which the student must adapt himself or pay the penalty, whether that be merely personal dissatisfaction or the supreme punishment of being forced to leave school. At the same time, the student must begin his preparation for adaptation to his future environment after leaving school. The task of the Personnel Department in assisting this process of adaptation is clear, but its function in regard to the first two requirements is not so evident. Inasmuch as the department's function is similar in regard to both, for the sake of brevity, any explanation is confined chiefly to the first requirement: A stimulus toward the proper cultural ideal.

One can express this requirement in another way by saying that each individual student should be awakened to the realization that culture is not some indefinite item of personal equipment which one acquires through spending four years in college and then retains throughout life. Even as a student the young man should try to get a proper, proportional interest in, and relationship to, those various vocational and liberal subjects which make up the well-rounded man's field of

interest. A survey conducted by the curriculum committee of the Wharton School shows that at the present time approximately 52 per cent of the total units taken by the student body as a whole are in general educational courses not directly related to business. This proportion is maintained fairly well throughout the entire four-year course. It is not concentrated in any one or even two years, a proportion which it is hoped Wharton men will be stimulated to maintain throughout life.

Yet this requirement of the proper cultural ideal, as well as that of a sense of social obligation, is not one which a board of examiners can rate with even an approximation of justice as has already been pointed out. It is rather a matter of atmosphere which the student almost unconsciously absorbs. Mimeographed assignments can not inspire it nor class instruction force it. It must spring from delicate personal guidance and from sympathetic handling of individual problems and ambitions. To be an important factor in the creation of such an atmosphere on the part of both faculty and students is a major function of the Department of Student Personnel, just as important, in truth, as its more obvious tasks of vocational guidance, placement and follow-up. Both objectively and subjectively, therefore, the functions of the Personnel Department cannot be divorced from the purpose of the school and the specific requirements into which that ideal goal is translated.

### C. STATEMENT OF GENERAL PROBLEM

Hitherto we have been looking at the problem of individualizing education entirely from the side of the students. They are not the only members of our colleges who need personnel work. I overstate the case very little when I say that we teachers need a Department of Professorial Personnel just as much; to advise the individual instructor concerning his own problems of adaptation to present-day university life.

We, as a group, representing our particular schools, have obligations to our students which we find difficulty in carrying out. Our obligations fall under two general heads: (1) The *individual* student must be afforded the facilities for the utmost development of his capacities in accordance with his interests and in view of his future rôle in society and business; (2) the transition from college life to business life must be made as easy as possible. It is this last obligation which started the college personnel movement. Though its primary aim was to help the student, the instructor was also assisted in his work with his students.

But the teacher's problems in regard to his obligations are far from being solved. The whole field of vocational guidance is still in an undeveloped state. Curricula are being weighed. Many questions are being asked as to the results of the present methods of education, especially on the gifted student. Never were so many colleges making educational experiments. The professor thus has his problems just the same as the student. He needs some agency in sympathy with the purpose of the school which will investigate the results of his teaching, not only while the student is in school, but also after he has graduated. He

must be kept informed as to the results of educational experiments in other colleges. He must know what employers think of the graduates of his college, of their general attitude, of their technique of thinking and solving problems, of the suitability of their content of knowledge. The reactions of graduates to their alma mater and their suggestions for its improvement must also be made available. Even more important than that, the teacher must know the long-run developments which are calling for new types of students and training. The type of man society will require ten or twenty years from today is the type we must be developing today.

The various problems which must be solved before education can be truly individualized make research and follow-up in its broadest sense absolutely essential to the Department of College Personnel.[2] Naturally the research activities of the professorial staff may be of assistance, but they lack the proper continuity and are of great specialization. What organ is more fitted to add the research and follow-up activities to its other duties and assume the responsibility for investigation and correlation of the various problems of the professor than the Department of Personnel? What organ in the school has had closer contact with the students as a whole and is more logically fitted to continue profitably the relationship after they have graduated? The name, Department of Student Personnel, paints only half the picture; it should be called, the Department of College or School Personnel.

[2] For an article bringing out clearly the further relation of the Department of Personnel to coöperative Research in Business and Industry, see Bingham, W. V.: "Student Personnel Service and Industrial Research." Journal of Personnel Research, Vol. 2, No. 2, June, 1923, pp. 55–64.

### D. CONCLUSIONS AND SUGGESTIONS

It may be well to emphasize the general points which have emerged from the efforts of the Wharton School to individualize its education:

1. The chief task of the Wharton School or any other college is, in the final analysis, a personnel problem. A college does not manufacture material products with the aid of mechanical devices operated by means of levers and pulleys—each article being just like its predecessor. Each student who enters is different from every other and has different problems. He needs particular and individual consideration.

2. Since the problem is so intimate and personal, it cannot be solved by clerks or a card system. Nor can the work be done from some central point in a large university by a person unacquainted with the students whom he is advising or recommending to some employer. The number of men whom it is possible for any one adviser to know intimately varies with the man, but certainly three to four hundred is a generous estimate. Though it is a truism, one must never forget that if personnel work in a college ceases to be personal, it also ceases to be personnel.

3. The institution of a personnel department assists the professor materially in fulfilling his obligations to the students, but it does not relieve

TABLE 1

*University functions in student personnel work*

**PRESIDENT**

**UNIVERSITY DIRECTOR OF ADMISSIONS**

- Selection of candidates for admission
- Administration of entrance and psychological examinations
- Procuring of history of student previous to admission
- Transmission of copy of history to various Departments of School Personnel
- Responsibility for coöperation of Departments of School Personnel, University Rating Division and Deans of Undergraduate Schools in setting entrance requirements and checking results

**UNIVERSITY OFFICER IN CHARGE OF STUDENT RELATIONS**

*University Committee on Personnel*

Exchange of opinions, problems, graduate placement opportunities and personnel methods of various undergraduate departments. An advisory body, composed of various School Directors of Personnel.

**Rating Division**

- Selection tests
- Vocational tests
- Rating scales

(Work of Psychology Department in collaboration with School Departments of Personnel)

**Physical Training Division**

- Physical examinations
- Physical training
- Treatment of special cases in conjunction with college personnel divisions and University Special Cases Division

**Scholarship Division, with advice of School Personnel Divisions**

**Welfare Division**

1. University student problems
2. Judgment over cases of immorality

**Special Cases Division**

- Medical
- Physical
- Psychopathological

**Housing Committee**

1. Health Hazards
2. Moral Hazards

**Houston Club**

(Student union)

**Part-time employment in conjunction with School Placement Divisions**

**Dean of Undergraduate Schools** — School Director of Personnel (See Table 2)

**Dean** — School Director of Personnel

**Dean**

**Dean**

*Note:* In explanation of this table, it should be stated that the guiding principle which is adopted for the functions of the university is the same as those regulating the department of the separate school: Student problems as they concern the university as a whole, solution of university administrative problems and obligations which are outside the administrative scope of the schools; scientific investigations which apply to all undergraduate colleges equally, and finally, treatment of abnormal or special cases which would be uneconomical for the separate schools to undertake to handle.

TABLE 2

*Table of an undergraduate school department of personnel*

**DEAN**

**School Director of Personnel**

**Faculty Advisory Committee** | **Student Advisory Committee**

| Research Division | Personnel Division | Placement Division | Follow-up Division |
|---|---|---|---|
| General clearing house for educational experiment in other schools and foreign countries | Freshman orientation | Employment service to (a) undergraduates (b) seniors | Employment service to alumni |
| General research in results of present teaching methods, suitability of curricula offered, and most pressing social needs, both present and future | Routine interviews with all freshmen and sophomores | Vocational interviews with juniors and seniors | Collection of alumni records |
| Collaboration with all Wharton Divisions and University Rating Division on their special research problems | Advice as to courses and general problems | Vocational advice in collaboration with both Personnel Division and University Rating Division | Interpretation of records in collaboration with Research Division |
| Further collaboration with research agencies of other colleges and of business firms or organizations on problems affecting curricula construction and vocational guidance. | Complaints | Employment connections with plant and trade associations | Information regarding affairs of interest in school to alumni |
| | Group grievances | Survey and classification of opportunities in collaboration with Research and Follow-up Division | Enlisting of alumni advice and suggestions regarding changes and efficacy of curriculum |
| | Contacts with individual instructors | Cataloging and making available to students of all possible information concerning possible vocations and their requirements | Continuation of educational service to alumni through important speeches of faculty, alumni, etc. |
| | Responsibility for coöperation of teaching staff | | |
| | Responsibility of coöperation of fraternities and other student societies and organizations to discuss and solve general student problems of Wharton School | | |
| | (Special medical, psychopathological, and immoral cases to be turned over to University Special Cases Division and Welfare Division, see Table 1) | | |

**Record and Clerical Division**

Clerical assistance to all divisions
Keeping in order of all records
Procuring copy of medical examination records from gymnasium where they are now kept

him of all necessity of personal contact with and inspiration of the students outside the class room. His coöperation must be stimulated; for he is a more important factor in the university department's success than the foreman in the proper functioning of the plant personnel department. In fact, the experience of the Wharton School shows that there has been more worth while contact between instructor and student than before the organization of the personnel department.

4. It is hoped that much may also come from the utilization of older and well-balanced students to help the department in difficult cases of adjustment. There is no doubt that such students and also the student organizations can be of great assistance. The Wharton School has attempted such coöperation too short a time to permit definite prophecy.

5. The purpose of the school and problems faced in realizing its purpose must be a major consideration in college personnel work. It is likely that its development and functions in every school or university may be somewhat different. It is unwise to borrow thoughtlessly. It is much wiser to let the expressed needs of the students or some pressing administrative problem affecting the students be the stimulus rather than a desire not to let the other school get ahead of one.

6. A solution of the college personnel problem is not easy. It cannot be solved by kindness and sympathy alone. All the sciences that investigate human nature must be utilized. More than that, we must practice the scientific method of getting all the facts and basing our solutions on a careful study of them; facts not only of the lives and records of the students but also of the business world. Intelligent, correlated research is necessary in any personnel department worthy of the name.

7. Yet throughout the whole tangled skein of problems to be met by the personnel department, there is always one obvious thread: How to guide the individual student to his highest development in the light of his capacities and interests and the needs and opportunities of society. In considering that question not only are the reactions of the individual student to his environment important; the college stimulus in the shape of professor, subject matter, method of teaching and school environment are equally important. Both must be weighed and perhaps changed from time to time, if the problem of individualizing education is really to be solved.

8. Such being the problems too much stress can never be laid on the qualifications of the men in charge of the work.

9. Finally, the question arises as to what a logical development for the future may be. For the sake of conciseness in answering, the use of two tables may be permitted. Table 1 portrays a conception of the rôle the university might play in assisting the various School Departments to function most efficiently. Table 2 pictures the functions which seem properly to belong to an undergraduate, or more particularly, the Wharton School Department of Personnel.

(*Manuscript received March 5, 1926.*)

# Book Reviews

## THE PSYCHOLOGY OF VOCATIONAL ADJUSTMENT

*By Harry Dexter Kitson. Philadelphia: J. B. Lippincott Co., 1925. Pp. viii + 273*

REVIEWED BY GRACE E. MANSON

In the June issue of the Journal of Applied Psychology, 1923, the author presented a paper entitled "A Shift of Emphasis Needed in Personnel Research." The thesis of his article is "lessen the emphasis upon tests, at least temporarily, and place more emphasis upon the scientific analysis of the occupation until it has reached a stage of refinement equal to that of the tests." In the present volume the author reiterates and enlarges upon this previously expressed theme, the additional problem being to present a scientific methodology for vocational analysis. One of the chief contributions of the work is the bringing together of the author's investigations upon particular phases of the general problem. It is to be regretted that he has not given references to such studies as can be found in more detail in the journals. The reader is confused, wondering whether this is new experimental work or a summary of a previously reported investigation. Again time is wasted. The reviewer spent at least twenty minutes locating one article which she recalled having read previously and which was not cited.

The author first surveys the current methods used in vocational analyses and finds little in them of value. The methods usually employed attempt to describe the occupation in extraneous terms, test scores, opinions, or general hypothetical traits. The correct procedure according to the author would be to use terms describing exactly what the worker does in the occupation. The description of tasks performed by a secretary, prepared by Charters and Whitley conforms to this principle. Still qualitative descriptions, however detailed, are not sufficient. To be truly useful they must be refined by the use of quantitative terms. For example, in the occupation of proof reading the standard measure would be in terms of lines read per minute with errors per units of lines. A complete analysis would involve the measurement of the physical demands and conditions of the job; the economic characteristics, such as rates of pay, the promotion to be expected, the hygienic effects such as eye strain, and finally a more detailed psychological analysis involving the determination of the degree of intelligence required, the emotional requirements and effects, kinds of imagery, and the like.

The task seems a stupendous one. Aside from the intelligence test scores, standardized tests are not available. Trade test scores in those fields for which they can be secured offer some assistance. Ratings, and measurements of interests in their present stage of development are subject to large margins of error. It seems to the reviewer that Dr. Kitson reports on the less difficult phases of the problem, those in which the standard unit of measurement has been determined and used for a long period of time; as age (years), height (feet and inches), weight (pounds), experience (years, months, days), absenteeism (days lost), etc. But what units shall we use for measuring industriousness, initiative, energy, emotionality and hosts of other traits?

Detailed activities expressed in terms of frequencies are cumbersome measures, and not very satisfactory at best.

Even the most ardent advocates of psychological tests, or even aptitude tests, against which Dr. Kitson has a particularly strong complex, will find a great deal of value in his book. It is experimental and scientific. Although the author believes that, "the greatest service which science can render is not to select a vocational field for an individual, not to select workers for an employer, dramatic and desirable as these undertakings appear. Science will render its best service in furthering the interests of the individual while he is at work; or helping him to perform his work more efficiently; to become deeply interested in it; to see the future possibilities in it, to prepare himself for them and to realize them," the reviewer is of the opinion that the psychological testers are going to derive great benefits by having made available more refined and reliable criteria for their tests. Life holds many nemeses, but the promise of the book is in this direction.

## PSYCHOLOGY IN BUSINESS RELATIONS

*By A. J. Snow. Chicago: A. W. Shaw Company, 1925. Pp. xv + 562*

Reviewed by C. H. Griffitts

Four of the five parts of this book were written primarily for the merchant or prospective merchant. The fifth part "Psychology in Employment" was included, according to the author, because the merchant must hire people to assist him in the work of selling and operating stores and offices.

Part I deals with the "Psychology of the Consumer." In the first chapter, "The Fundamental Nature of Man," Dr. Snow classifies action as impulsive, habitual, and rational or volitional. Most buying is regarded as impulsive or habitual. The second chapter is a discussion of perception (or sensation) and ideation as stimuli to buying. Chapter three furnishes the consumer with "Safeguards in Buying."

Part II, "The Psychology of Marketing" contains six chapters dealing with the subjective and objective influences determining demand, and two others—"Merchandising" and "Types of Retail Selling Agencies"—which are less psychological.

Parts III, "Psychology in Advertising" and Part IV, "Psychology in Selling" include discussions of the topics usually found in books on the psychology of advertising and of selling. Little effort has been made to coördinate these two parts, and there is some repetition on the psychological side. Yet where only one course can be devoted to the "Psychology of Business," it will be convenient to have this material brought together in one volume. Part IV is perhaps better adapted for textbook use in such courses than any separate book on the subject that has been written. The psychology is elementary, but offers at least a beginning upon which the instructor can build. Experience in business leads the reviewer to believe that these parts of the book will be of greater value to the prospective merchant than to the experienced merchant. The chapter on "The Store" deals mainly with the selection and training of personnel based on a division of individuals into three types: verbal, motor or mechanical, and social. Salespersons should be the social type, according to the author.

It is probable that the chapter just mentioned and Part V will be of greater interest to the readers of this magazine than the other parts of the book. Fortunately for his readers, Dr. Snow does not limit the discussion in this part as he threatened to do in the Introduction. There is a general, schematic, and brief discussion of the similarities and differences between individuals and of the possible causes of these differ-

ences. There is a brief discussion and outline of such things as strength, intelligence, aesthetic endowment and mechanical ability, upon which individual adaptability to different occupations depends. This is followed by "The Search for Methods of Rating Human Quality," which is for the most part a discussion of physiognomy and phrenology. The need for such a discussion, may be questioned but it is doubtless useful in a book written for merchants or prospective merchants as long as such methods are employed by business concerns and as long as manuals on selling issued by life insurance and other companies, and by publishers to the trade are based avowedly upon such systems or "character analysis."

The need for job specifications and methods of obtaining these specifications are discussed. "Psychological Tests in Employment" contains brief discussions of general intelligence tests, special ability tests, trade tests, methods of verifying and standardizing tests, technique and the advantages and disadvantages of tests. The tone is conservative, but mainly positive. No doubt many readers will regret that this section was not expanded at the expense, if necessary, of some of the other and less psychological discussions. The most detailed and interesting sections of this chapter are devoted to a description of the author's well-known tests for taxicab drivers.

As to the purpose and plan of the book the author states that it was "written for the business man and the student of business;" also, that "Discussion of the generalities and technicalities of psychology has intentionally been omitted from this work; it is an application of principles rather than a discussion of them."

The style is clear and straightforward. The material is well outlined, although some of the outlines are bare and schematic. Though somewhat elementary with regard both to psychology and to business practice, the author does not talk down to his readers. Splendid summaries at the end of many of the chapters add to the usefulness of the book. Good bibliographies are also given, though marred by frequent typographical errors. There are four different versions of D. G. Paterson's name on pages 498 and 501. But let those who have never sinned throw the stones.

## DYNAMIC PSYCHOLOGY

*By T. V. Moore. Philadelphia: J. B. Lippincott Co., 1924. Pp. viii + 444*

Reviewed by B. V. Moore

The author states in the preface, that the purpose of the present work is to give the student: "(a) An insight into the moderate trends of psychology; (b) a foundation for a practical understanding of his own inner life that will be of assistance to him in the solution of the mental difficulties that continually arise in the course of an ordinary existence, and (c) an introduction to the clinical problems of psychology that will open the way to an appreciation of borderline cases and a technique for handling them, should a medical training lead him further into this field." To this we might add, that considerable attention is given to abnormal functioning. However, the facts of such human behavior are consistently used to throw light on the dynamics of normal behavior, including consciousness. The book is divided into six parts and a conclusion.

Part I. *The Analysis of Mind*, gives a brief history of psychology, and presents a short chapter on the stream of consciousness. Three chapters are devoted to the unconscious, and one to the classification

of mental processes which groups the materials of psychology into mental functions, mental products, and mental dispositions. Under these general headings classical terms are used, but it is the only place in which many of these aspects are mentioned.

Part II. *Stimulus and Response and Human Behavior.* This is a discussion of motor, secretory, cortical, and psychic reflexes. "It is not, however, proved beyond all doubt that stimulus and response in instinctive behavior involves nothing more than obtains in the simple mechanism of the reflex multiplied *n* times by itself. There may be somewhere in the chain of events a certain element of organic control which is not present in the simple reflex arc." After reviewing critically various experiments on the conditioned reflex, the author, in referring to Pavlov's interpretations, writes: "Everything could be easily explained psychologically by expectation or loss of expectation of something good or bad being put in the mouth. The conditioned reflex, instead of banishing introspection and explaining consciousness in voluntary action, itself demands an explanation."

Part III. *Human Emotional Life.* In the affective mental states there are two groups, simple feelings and emotions. "Simple feelings may be divided into two classes: (a) Those that arise in response to mere sensations, (b) those that arise in response to meanings and intellectual insights. The latter class are affective elements that give to an emotional complex its specific character. The affective mental states cannot be looked upon merely as attributes of sensation. They are independent forms of our mental life.

"The Lange-James theory which regards the emotional resonance as the cause of the emotion reverses the real order of sequence in the causal process which relates the emotion to its expression. . . . . This bodily resonance is unquestionably perceived, and because it is perceived constitutes one event in a series of phenomena which makes up the emotional display."

Besides a critical discussion of the theories of the affective states, particularly of the Lange-James theory of emotions, the author adds an interesting chapter, with drawings, on the expression of the emotions.

Part IV. *The Driving Forces of Human Nature and their Adjustment.* Dr. Moore leaves undisturbed the common or popular concept of instinct. Instead of trying to redefine or limit it to a concept of unit innate tendencies, into which some writers have analyzed the old teleological instincts, he recognizes as many simple tendencies as there are possibilities of reaction and calls the consciousness of any of these tendencies to act an impulse. A classification of these impulses includes much of Thorndike's list of original tendencies.

Following the chapters on instinct and desire, there is an excellent exposition of the conflict. The wholesome conflicts of early childhood are described in a comprehensive manner.

Introducing a series of chapters on mental adjustments, the author proposes two new names, "psychotaxis" and "parataxis." Psychotaxis is used to designate a more or less normal or healthy mental adjustment. Abnormal emotional adjustments are designated as parataxes. Anxiety, depression, compensation, and sublimation are each given a chapter.

Part V. *Psychoanalysis and Psychotherapy.* In this part Freud, Jung, Adler, and Adolf Meyer each receive a chapter in the presentation of his views. The psychopathology and psychotherapy of Meyer are accepted as most sound, his writings being "characterized by a sane moderation, and full of valuable therapeutic suggestions." It concludes with a brief chapter on the technique of psychotherapy, including a brief blank record form outlining a schema for the mental examination.

Part VI. *Volitional Control.* After a brief review of theories of will and a consideration of the facts of attention, introspection, and reaction-time experiments, the conclusion is presented "that the act of will is a mental element with its own quality, intensity, and duration." The theory of ideomotor action is criticized elsewhere. Woodworth's theory of the cause of voluntary movement, termed the theory of conceptual control, is reviewed with Angell's criticism of it. The author

concludes that we have non-sensory mental states which are necessary in the determination of what we intend to do. Besides the representation of an action there must be a *fiat*, an act of volition which is the final determinant of a voluntary act. An illuminating chapter on the pathology of voluntary action follows this discussion, and the consideration of will ends with a chapter developing a concept of freedom of the will. Much of the discussion is a presentation of evidence against any other viewpoints—in fact one of the characteristics of the book is the use of this sort of negative proof.

The book brings psychology, clinical psychology, and psychiatry closer together. The author's wide experience and study in these fields gives versatile and sympathetic interpretation of some controversial problems in what might be called middle ground or no-man's land. He successfully carries out the ideal that abnormal mental processes and normal mental processes should each throw light on the other. Although some of the discussion and argument is of a negative nature its limitations are not such as to mislead the reader. This book is well written, is one of the most scholarly that has appeared recently in this field, and should prove valuable as a textbook or as supplementary reading for classes in abnormal psychology, applied psychology, or advanced psychology.

## A COLLECTION OF DECISIONS PRESENTING PRINCIPLES OF WAGE SETTLEMENT

*Edited by Herbert Feis. New York: H. W. Wilson Co., 1924. Pp. 452*

Reviewed by Z. Clark Dickinson

The decisions, from which extracts are herein reprinted, have been promulgated by voluntary arbitration and state industrial boards in the United States, Australasia, Great Britain, and Canada, during the past twenty years—most of them since the war upheavals began. The authorities quoted, therefore, run from grave gentlemen accustomed to judicial robes (in the high courts of Australasian commonwealths, and in Kansas), through commissioners of our Railroad Labor Board and various Minimum Wage boards, arbitrators chosen by employers and unions for only the one dispute in which they appear, to continuously-retained industrial judges like those in our men's clothing industry. A few non-judicial documents are also reprinted, from trade-union advocates and others, voicing arguments in favor of this or that principle of wage regulation. All excerpts are grouped according to the main argument they discuss, such as standardization of wages for a given type of work, nature of differentials among classes of workers, living wage, cost of living, or condition of the industry. The editor, by frequent insertion of introductory comment, has tried to indicate the significance of the various items; and a further measure of unity will be discerned in the work if the reader is already familiar with Professor Feis's earlier book *The Settlement of Wage Disputes* (New York: Macmillan, 1921), in which he attempted to confront economic theory on wages with the concrete situations and practices encountered by arbitral bodies of the type quoted in the present volume, and in which he tried to suggest outlines of a statesmanlike policy for future collective settlements in the United States.

In details of workmanship, the book is unusually satisfactory, except that the indexing is quite inadequate. The format and typography are excellent, and a useful bibliography is appended. As we pass on to consider its probable usefulness, we must

realize that it is a mutant, founding a new family, whose nearest cousins are (I suppose) the familiar legal case-books. Unlike the latter, however, the decisions cited are not expected to have weight as precedents (outside the jurisdiction of the board quoted), or to show close approaches to self-consistency as a body. The book is offered, rather, to students of wage theory and practice, as a collection of concrete, illustrative details, including the varying methods in which responsible arbitrators have attempted to solve their problems. Hence it resembles also the "case-books" now used extensively in business administration courses, at Harvard and elsewhere; and, like the latter, makes easily available to readers everywhere many cases which could previously be studied only in various widely-separated places. Naturally all case-books have their limitations; for instance, any manageable printed report simplifies the actual situation (which characteristic is usually not objectionable for purposes of study by comparative beginners), and generally we are left to imagine just what happened after our decision was announced and the curtain rung down by the judge.

Professor Feis seems to have founded a new line of case-books then (for other matters of controversy than wages can be worked up by the same technique), for which the experience of its cousins indicates considerable ultimate use. What shall be said of the judgment he has displayed, in selecting and analyzing his material? I am not sufficiently familiar with the whole existing body of decisions (including those in other languages than English) to criticize the selection. Readers who are familiar with the personnel administration movement, however, will be surprised that, in connection with the vital topics of wage standardization and comparisons of "going rates" among various crafts and industries, neither the editor nor the judges he quotes have given much attention to the developing technique of job analysis, as practiced within business establishments and by civil service agencies. And readers who are more at home in economic theory will find their appetite for the new factual material (and the less new arguments) whetted by frequent opportunities for controversy with the editor. For example, in dealing with the "condition of the industry" question, should he not consider further the available statistical investigations as to differences in costs and profits among the several establishments within specified industries, so as to sharpen his concepts of "marginal" and "representative" firms, and their rôles in supplying more or less volume of employment in consequence of a given wage-edict? Should not the action of supply and demand be traced further, in considering whether wages for a given type of work should be standardized throughout many localities?

# Books Received

**(Notice here does not preclude fuller notice later)**

*Intelligence and Immigration.* Clifford Kirkpatrick. Mental Measurement Monographs, No. 2. Baltimore: The Williams & Wilkins Co., 1926. Pp. 127. $4.00.

*Light and Health.* M. Luckiesh and A. J. Pacini. A plain story, simply and easily told, of the profound effect of light on human health, human happiness, and personality. Baltimore: The Williams & Wilkins Co., 1926. Pp. viii + 302. $5.00.

*Scientific Foundations of Business Administration.* (*Human Relations Series, IV.*) Edited by Henry C. Metcalf. Baltimore: The Williams & Wilkins Co., 1926. Pp. 341; $5.00.

*The Administration of Industrial Enterprises.* Edward D. Jones. New York: Longmans, Green & Co., 1925. Pp. v + 618.

*Educational and Vocational Guidance.* William Martin Proctor. A considera-

tion of guidance as it relates to all the essential activities of life. Boston: Houghton, Mifflin Co., 1925. Pp. xv + 352.

*Methods of Teaching Industrial Subjects.* ARTHUR F. PAYNE. New York: McGraw-Hill Book Co., 1926. Pp. xx + 293, $3.00.

*Investigation of Business Problems.* J. EIGELBERNER. Chicago: A. W. Shaw Co., 1926. Pp. xi + 335. $3.00.

*Mainsprings of Men.* WHITING WILLIAMS. New York: Charles Scribner's Sons, 1925. Pp. 313.

*Increasing Personal Efficiency.* DONALD A. LAIRD. New York: Harper & Bros., 1925. Pp. x + 209.

*A Psychological Study of Immigrant Children at Ellis Island.* BERTHA M. BOODY. Mental Measurement Monograph, No. 3. An investigation of the mentality of the immigrant stream as it reaches the doors of the United States. Emotional and physical conditions of entrance are discussed. Procedure at Ellis Island is described. Baltimore: The Williams & Wilkins Co., 1926. Pp. 163. $4.00.

*Proceedings of the Fourteenth Annual Congress of the National Safety Council.* Part II: Public Safety Sessions. Cleveland, September 28 to October 2, 1925. Pp. 164.

*References on Child Labor and Minors in Industry, 1916–1924.* Compiled by Laura A. Thompson, U. S. Bureau of Labor, Children's Bureau. Bureau Publication No. 147. Washington: Government Printing Office, 1925. Pp. 153.

*Bibliography on Vocational Guidance: A Selected List of Vocational Guidance References for Teachers, Counselors and Youths.* Federal Board for Vocational Education. Revised edition, December, 1925. Bulletin No. 66, Trade and Industrial Series No. 19. Washington: Government Printing Office, 1925. Pp. ix + 85.

*Vocational Guidance and Junior Placement: Twelve Cities in the United States.* U. S. Bureau of Labor, Children's Bureau. Children's Bureau Publication No. 149. Washington: Government Printing Office, 1925. Pp. 440.

*Report of the United States Coal Commission.* U. S. Coal Commission. 5v. Washington: Government Printing Office, 1925.

*Popular Research Narratives, Vol. II.* Collected by the Engineering Foundation. Baltimore: The Williams & Wilkins Co. 1926. Pp. viii + 174.

*The Valuation of Liabilities Under Industrial Pension Plans.* J. H. WOODWARD. A paper read before the Actuarial Society of America, October 26, 1925. New York: L. W. Lawrence, 1925. Pp. 37.

*Health Control in Mercantile Life: A Problem of Conserving Human Energy.* ARTHUR BREWSTER EMMONS. New York: Harper and Bros. 1926. Pp. xi + 234.

*Handbuch Psychotechnischer Eignungsprüfungen (Handbuch der Arbeitswissenschaft, vierter Band).* FRITZ GIESE. Carl Marhold, Halle, 1925. Pp. 870. Bibliography pp. 850–856.

*Zur Psychologie und Psychotechnik des Versicherungsagenten.* FRANZISKA BAUMGARTEN. Leipzig: Barth, 1925. Pp. 62.

# Abstracts

*Analyzing the Health and Accident Records of a Decade.* H. W. MOSES. National Safety News, December, 1925, Vol. 12, No. 6, pp. 13–16.

Outlines the early conditions and quotes the accident and health experience of the Edison Electric Illuminating Company of Boston since the establishment of their medical department in 1913. Tables of statistics are given showing absenteeism due to all causes of disability.

Colds occupy first place. Women are poorer hygienic risks. Malingering is not apparent. Employees are working under conditions making for high efficiency. Total costs of the benefit plans have not been excessive. Managers of benefit associations can profit much from studying trends of disease in order to lessen the drain on their treasuries.

Points out that the information in the tables permits broad interpretations whereby further efforts may be made to conserve and improve the health of employees, and suggests studies for the determining of accurate morbidity statistics which would be of great value in the war against disease.

*The Need for More Definite Analysis of Accident Causes.* LUCIAN W. CHANEY. Annals of the American Academy of Political and Social Science, January, 1926, Vol. 123, No. 212, pp. 41–45.

Cites first the need for a definition of the terms, "cause," "accident," "analysis," and gives the meanings generally used by the International Association of Industrial Accident Boards and Commissions.

Shows that a "more definite analysis" is to be secured neither by extending the classification of physical causes nor by investigation at the present time into the subjective factors that cause accidents, but maintains that the elements of exposure and severity cannot be ignored.

Illustrates the use of frequency and severity rates and contends that improvement in the handling of accident causes must be obtained by more careful, more exact original reporting of the cases, and by a proper determination of the exposure and its application to the cause classifications now usually made.

Note: This issue of the Annals contains many other articles on Industrial Safety, covering such fields as, (1) The Need for Safety in Industry, (2) The Organized Accident Prevention Movement, (3) Safety Code Development and Enforcement, (4) Accident Prevention for Certain Hazards, (5) Safety in Specific Industries, (6) Educating the Worker in Safety, (7) The Relation of Safety, Compensation, and Rehabilitation.

*The Protection of Family Life Through Accident Prevention and Compensation.* JOHN B. ANDREWS. Annals of the American Academy of Political and Social Science, September, 1925, Vol. 121, No. 210, pp. 1–9.

Gives an outline picture of the effect of industrial accidents on the families of the injured workers, the social consequences of such distress, and the results of several authoritative studies of what happened to the stricken family before the advent of workmen's compensation and still happens where it does not apply.

Prevention is the only complete remedy, and in the case of children, until child labor is abolished in industry, extra safeguards and measures of protection must be taken. But in spite of all preventive measures, a residue of accidents will remain that are inevitable and for these protection must be provided through adequate compensation laws.

Discusses the evils of the old damage suit system and outlines the principles of

modern workmen's compensation. The superiority of workmen's compensation to the old system of employers' liability is indicated in the results of two official studies.

Asks what remains to be done to make compensation legislation adequate and gives the following desirable standards to be aimed at:

(1) Relief must be certain, prompt, and automatic, and applicable to all.

(2) Earning capacity of the injured worker must be restored as completely and as quickly as possible.

(3) Loss of earnings due to accidents must be met at least to a degree that will prevent individual and family distress and social degeneration.

(4) The stimulus of compensation laws to accident prevention should be fully utilized.

*Examinations That Weed Out the Incompetent Driver.* J. McKeen Cattell. National Safety News, January, 1926, Vol. 13, No. 1, pp. 31–33.

The Committee on Causes of Accidents, of the National Conference on Street and Highway Safety, Department of Commerce, has recommended that applicants for licenses to operate motor vehicles on public streets and highways be divided into four groups:

*Group A.* Applicants for licenses to drive private cars.

*Group B.* Public chauffeurs, including drivers of taxicabs, busses, trucks and emergency vehicles.

*Group C.* Applicants suffering from some disability such as defective eye-sight or hearing, loss of limb, old age, illiteracy, a record of insanity or conviction of crime.

*Group D.* Those who have been responsible for accidents resulting in personal injury or considerable property damage, or who have been convicted of serious offense under the laws governing the use of motor vehicles.

It is recommended that Group A applicants should fill out an application blank, giving age, sex, place of birth, legal residence, and for purposes of identification—height, weight, and color of eyes and hair. Consideration might be given to requiring in addition, signature, photograph or finger prints.

The next step would be to give an information test consisting of printed questions designed to discover the applicant's knowledge of the laws and traffic regulations which he is expected to obey, his judgment in operating a car, and his ability to recognize difficult, dangerous or illegal situations. This should be a uniform test that would be of equal difficulty at all times and all places.

The applicant could be allowed twenty minutes to answer thirty questions, the number and difficulty being such that only those in the superior tenth could answer all questions within the time allowed. This method permits the examination of a single applicant or a group simultaneously.

In addition to the written information test there should be an individual road test which should also be standardized so that it could be reported, e.g., that an applicant stands in the upper fifth or lower tenth of all applicants.

There should be a more thorough and difficult examination before a license is granted to members of Group B. For professional drivers the information blank should be more complete and the written examination and road tests more exacting. In addition there should be a physical and psychological examination. Eye sight and hearing should be tested, and probably color blindness. There should also be a psychological test of quickness and accuracy of response to the situations that the driver will meet, including his presence of mind under disturbing conditions.

Members of Group C should be given a special examination in which their specific defects would be properly weighted. A point percentile system could be used to special advantage in the case of the defective and handicapped groups.

Group D drivers should be required to undergo a special exmination for competency, such as is recommended for professional chauffeurs and handicapped classes, with such further examination of the individual and of the circumstances as might be desirable.

The time required for the examination

and the fee exacted would differ for the four groups. Group A examinations should not take more than forty minutes. The cost of the license to the applicant might be from one to two dollars. The professional chauffeurs' examinations would require at least an hour and would cost from two to four dollars. The time and cost would be the same for the handicapped group, though it might be more if expert oversight were necessary. The examination of those involved in accidents might require approximately two hours of the individual's time and would cost from five to ten dollars.

*Some Psychological Experiments.* J. McKeen Cattell. Science, January 1, 1926, Vol. 113, No. 1618, pp. 1–8; January 8, 1926, Vol. 113, No. 1619, pp. 29–35.

Reviews in part the experimental work done by the writer during the period from 1881 until the present time. The viewpoint taken is that "psychology, on the one side, is concerned with conduct as well as with consciousness, behavior being the more open to experimental investigations and their useful applications; on the other side, that individual differences are of primary importance, both for constructive science and in the practical affairs of daily life."

Reaction time experiments performed during the early eighties proved that psychology was an exact, experimental science, dealing with quantitative differences. These experiments were also the forerunners of the present day mental and educational tests. Other fields of investigation, such as practice, learning, memory, fatigue, etc., have proven fruitful. More work should be done. Stated in the author's inimitable style, "It is absurd that researches whose economic value can only be told in billions of dollars and whose contribution to human welfare is even more immeasurable should await the pleasure of a few academic psychologists who take them up in the intervals between coaching the members of a junior social and athletic club and helping with the family housework, and then only until they get into difficulties with one president or themselves become president."

*Psychological Tests in Guidance: Their Use and Abuse.* Morris S. Viteles. School and Society, September 19, 1925, Vol. 22, No. 560, pp. 350–356.

Names and discusses the principles believed to be fundamental to the scientific use of tests in the adequate guidance of the individual, according to a committee report of the Vocational Guidance Association of Philadelphia and vicinity. Study was carried on for the purpose of determining the use and abuse of tests in guidance in the Philadelphia school system. Ten principles are set forth:

1. Grouping by abilities for purposes of instruction must be considered as a phase of guidance, but the validity of group test results as single criteria for the ability grouping of individual pupils for purposes of instruction has not yet been satisfactorily demonstrated.

2. The results of group intelligence examinations have little significance in the guidance of an individual toward a career.

3. One of the most fundamental principles in the use of tests in guidance is that an intelligence quotient, whether obtained by means of a group or individual examination, has extremely little significance in vocational guidance.

4. The factors which determine vocational competency are the individual specific mental abilities. For positive guidance the specific abilities of importance in the various occupations must be subjected to measurement.

5. Tests, to be of service in guidance, must measure not only the general and specific mental abilities which are of importance in vocational success; tests must also be provided to measure the temperamental and character qualities which play so great a part in vocational adjustment.

6. In the examination of the individual for the purposes of guidance the observation and interpretation of the quality of the performance is at least as important and in many cases more important than the quantitative score.

7. For dependable results in guidance tests must be applied by trained personnel. In all cases the interpretation of tests

results for purposes of guidance can only be made by the clinical psychologist.

8. Objective scores of tests designed to measure mental ability can only be at all significant after norms of performance have been established.

9. The validity of a test or of a battery of tests as measures of a trait or traits significant in guidance can only be determined by a correlation of test results with "an adequate criterion of ability to succeed in the work in question."

10. The results of a mental examination regardless of how intensive it is and who conducts it are not valid as a single criterion for vocational guidance.

That tests are useful and that they are the best measures of differences in mental ability and that they are important for vocational guidance purposes when scientifically employed is fully recognized.

*The Elimination of Practice in Mental Tests.* L. T. MORGAN. Journal of Educational Psychology, December, 1925, Vol. 16, No. 9, pp. 619–628.

Considers the complications caused by practice in experiments where certain specific functional changes are estimated by performance or output, and presents three main alternatives to solve the problem: (1) choice of tests, the performance of which is not affected materially by practice or repetition; (2) elimination of practice by a prolonged period of repetition previous to the commencement of the experiment proper; (3) adoption of method of "equal groups."

With regard to the first, there are very few tests now in use that are not influenced by practice, so at present a solution by the first alternative can hardly be looked for. The second is discussed in detail and the conclusion reached is that a practice period is necessary for tests involving estimation of output as indicative of changes in efficiency. Until more is known about the correlation of ability and improvability the only satisfactory arrangement is that of adopting a prolonged period of practice for each set of conditions, and for each subject and task.

Describes the method of "equal groups" and states that some writers think it most effectively eliminates the effect of practice. Some of the objections to this method are considered, notably, the variation of improvability, and the relationship of this to ability. It was desired to find the closeness of this relation at various stages in the practice curve, so the performances of thirty-five children in an addition test used in fatigue work were recorded, the whole being done under carefully arranged conditions and using incentives to obtain maximum effort. The results showed that there is a tendency for performance to be associated with the amount of improvement in the earlier phases of a practice curve, and it is this phase where the equal-group method is generally used.

Theoretically, the interval on the practice curve when the correlation between score and improvement is highest is the only part where the method of equal groups is justified but practically it works conveniently with certain reservations: (1) the ability distribution given by a particular test is true only of that particular state of practice; (2) the fewer the number of attempted performances subsequent to accepting this distribution, the more likely is the method to be effective; (3) if a number of tests are to be made, change of distribution by practice will make itself evident and new trials are necessary to adjust the differences.

*A Scale for Scoring Tests with Alternative Answers.* GILBERT J. RICH. American Journal of Psychology, October, 1925, Vol. 34, No. 4, pp. 597–600.

Carries further the mathematical procedure developed by O. W. Richards in the Journal of Experimental Psychology, 1924, Vol. 7, pp. 148–156, for scoring tests having alternative answers, and for use instead of the usual method in which the factor of chance is not eliminated thus permitting a guesser to make significant positive score.

Discusses Richards scale, pointing out its weaknesses, and suggests that a scale should: (1) increase from maximum of zero for no items correct, thereby avoiding negative scores; (2) reach maximum value of 100 when all items are correct; (3) have successive steps which are inversely proportional to the probabilities of obtaining the respective values by mere chance;

(4) be mathematically homogeneous, expressible by a single general formula, so that all parts of the scale would be statistically comparable.

Develops a new series of formulae and works out a completed scale for the same examples as Richards used. Discusses the final test of this type of scale and suggested that its utility depends on whether or not in actual use it produces results which are significant in interpreting the tests to which it is applied.

*Personality Differences in Intelligence Test Performance.* GRACE E. MANSON. Journal of Applied Psychology, September, 1925, Vol. 9, No. 3, pp. 230–255.

Expresses the conviction that much more information could be gained from group intelligence tests than is indicated by the total score. Consequently, a spiral adaptation of the Army Alpha, Bureau of Personnel Research Test VI, was studied for the value of the results that might be obtained from the scores of eight widely different groups of persons; a report on the findings were given in the Journal of Applied Psychology, Vol. 9, No. 2.

The present paper deals specifically with the significance of omissions as expressions of personality. Objective records and introspective reports were both studied for two groups of persons making equivalent final scores. Examination of number of examples attempted, number of errors, number of omissions, and types of question having the greatest number of errors and omissions showed that omissions are controlled by form of question and answer, by difficulty of question, and by the reactions of the subject toward the urge to speed up, to disregard the directions not to omit, and to put down only correct answers.

With respect to choice of "caution" stimuli Groups I and II differ. Caution may be exhibited in three ways: (1) cautiousness of directions makes omissions impossible, and incorrect answers probable; (2) cautiousness of accuracy, desire to have only correct answers, leads to omissions, or few examples answered; (3) cautiousness of time, desire to finish the test, means likelihood of omitting or making errors on difficult and time-consuming questions The choice between these has to be made by the subject and the responses are an expression of his personality.

On this basis Group I subjects were more apt to respond to the speed factor than was Group II. The tendency not to follow directions when the subject sees that more favorable results may be gained by omitting could, perhaps, be called initiative, and the tendency not to follow directions, and omit, when the subject fears to put down the incorrect answer, may be called timidity, or lack of initiative.

An effort was made to measure the several caution reactions found in Group II. Self-ratings on "caution" were taken as the criterion. When a combination of the three items, speed, omissions, and errors, is made by multiple correlation, the coefficient becomes $0.42 \pm 0.08$. This equation is probably of little value for other groups, due to the questionable reliability of the criterion as well as the internal consistency of Group II. However a detailed examination of errors and omissions on Test VI, supplemented by introspective reports of the subjects in respect to reasons for omission, will give insight into their personalities which is not ascertained through total scores alone.

*To Test—Or Not to Test.* ALIDA E. FINCH. Prince Alumnae News, February, 1926, No. 11, pp. 28–29.

Reviews the experiences of the Strawbridge and Clothier Company, Philadelphia, in the use of tests for employment and promotion purposes. Testing was begun in 1919, using a mental alertness test, and clerical, typing and stenographic tests, and in the intervening years enough applicants have been tested to fully prove their value.

Cites the importance of knowing the value of high marks in any one part of a test and mentions promotion that was decided by just one part of the mental alertness test, the exercise for language facility. Discusses the development of a "Store Policy" test for applicants to selling positions. The mental alertness test did not prove satisfactory for this work, and this test, which is also used for instruction purposes by the training department, is the result.

*Partially Standardized Tests for Junior Clerk.* Public Personnel Studies, December, 1925, Vol. 3, No. 12, pp. 346–372.

Explains, first, why another set of tests for clerical purposes is added to the already long list, and secondly, why the tests are only partially standardized. Discusses the difficulties of standardization, why certain ones were omitted, development of the tests and their characteristics, and lists them as follows:

1. Copying and adding test
2. Business information test
3. Alphabetical filing test
4. Understanding of printed literature dealing with office problems
5. Social intelligence test
6. Understanding and following written directions
7. Completion of tabulations
8. Memory for oral directions
9. Abstract intelligence test
10. Education and experience

A complete set of tests is given in the appendix.

*Suggested Tests for Private Branch Exchange Operator.* Public Personnel Studies, February, 1926, Vol. 4, No. 2, pp. 66–79.

Discusses the duties, qualifications required, and factors governing the selection of tests for a private branch exchange operator. The complete set of tests is given and each one is explained, the titles are:

1. Operating equipment and procedure
2. Copying and adding
3. Understanding and following written directions
4. Understanding of printed literature dealing with switchboard or clerical work
5. Alphabetical filing
6. Memory for oral directions
7. Abstract intelligence
8. Education and experience
9. Operation

*Suggested Tests for Electrician.* Public Personnel Studies, March, 1926, Vol. 4, No. 3, pp. 106–116.

Gives a discussion of the need for well-selected electricians, and describes their duties, qualifications required, compensation, and form and content of the suggested tests. These are given in full but the outline is as follows:

Test 1—Work, materials, and equipment. . . . . (This test is in three sections. Section A consists of 50 statements in the so-called completion form with blanks which the competitor fills. Section B consists of 20 questions in the so-called multiple choice form with four answers from which the competitor chooses the best one. Section C consists of 100 statements in the true-false form; the competitor is to read each statement and indicate whether it is true or false.)

Test 2—The understanding of literature relating to electrical work. (This test consists of a quotation containing extracts from laws or regulations relating to electrical work or from some manual of instructions and 10 questions as to its meaning and interpretation.)

Test 3—The interpretation of a drawing of an electrical job. (This test consists of 10 questions as to the meaning and interpretation of a drawing of an electrical job.)

Test 4—Mechanical ability. (It is suggested that the Stenquist Mechanical Aptitude Test I consisting of 95 mechanical problems in picture form be used. A minimum required score of 55 is suggested.)

Test 5—Education and experience.

*An Approach to the Psychology of Motives.* A. J. Snow. The American Journal of Psychology, January, 1926, Vol. 37, No. 1, pp. 129–131.

Criticizes some of the favorite psychological conceptions of economists, principally, (1) that there is a certain kind of action called "native" and another called "acquired"; (2) that a man is a pattern of definite "instincts," or "instinctive drives," whose interactions determine his conduct. To study the problem of human motives without bias we must recognize that the reactions of any animal are due to the accumulated individual organic history, and this differs for different individuals. Environment is also an important factor. Therefore the only approach to the study of human motives is not in the abstract or general but in the concrete situations. The

best investigations for prediction would be a series of concrete case-studies, wherein individuals in specific situations are considered. Only in such a way shall the relationship that exists between human reactions and their causes be determined.

*The Psychiatric Element in Vocational Guidance.* RALPH P. TRUITT. Vocational Guidance Magazine, November, 1925, Vol. 4, No. 2, pp. 87–92.

Reviews the problems of vocational guidance from the psychiatric point of view and considers the difficulties presented by such factors as; attitude of industry, complexity of adolescent adjustments, instabilities of adolescents just at the time of choosing a vocation, the rôle of parents in the making of the choice, and the infantile imitation of the adult by whom the child happens to be most influenced.

States that one of the determining influences in the selection of a vocation should be the need for compensating for inferiorities, and illustrates by several cases. Another factor also is a child's attitude toward authority. From the psychiatric viewpoint it is essential to study the individual's social background, his personality make-up and intellectual capacity, and to fit him into associations which will square not only with his abilities but with his fundamental emotional needs. The latter are the most difficult to adjust to, and the problem then becomes one of detecting the reason for timidity, sensitiveness, lack of concentration, etc. It is a problem of determining what the child really is, of getting him to face his situation without pain or discouragement, and of persuading his family to allow him healthy self-expression.

*The Baking Industry in Cincinnati.* Vocational Pamphlet of the Cincinnati Public Schools, No. 5, 1925, pp. 64.

One of a series of occupational pamphlets prepared for the pupils of the Cincinnati Public Schools, and meant to be informational rather than advisory. Besides discussing the baking industry in general and its position in Cincinnati, the pamphlet describes the various kinds of bakeries and their workers, and takes up such other topics as: how to become a baker, conditions of work, related occupations, advantages and disadvantages, future, etc.

*Factors in the College Man's Choice of a Career.* PAUL S. ACHILLES AND EDITH MULHALL ACHILLES. Vocational Guidance Magazine, January, 1926, Vol. 4, No. 4, pp. 170–173.

Presents the results of a brief study of the careers of fifty-two college men as to the age of choice, considerations in and satisfactoriness of the choice, and preferred occupations.

The choices were made:

| | *Times* | *Per cent* |
|---|---|---|
| In childhood | 5 | 10 |
| Before entering college | 6 | 11 |
| In college (before senior year) | 11 | 21 |
| In college (during senior year) | 13 | 25 |
| After graduation from college | 14 | 27 |
| Undecided (4 years after graduation) | 3 | 6 |

(The median age at graduation was 22 years, A.D. 1.)

Subsequent records showed that all the choices made before entering college were permanent.

Factors influencing the choice were ranked as follows:

| | *Average* | *A.D.* |
|---|---|---|
| 1. Interest | 1.74 | 0.81 |
| 2. Aptitude | 3.00 | 0.81 |
| 3. Training | 3.78 | 0.83 |
| 4. Economic | 3.87 | 1.78 |
| 5. Social | 4.09 | 1.48 |
| 6. Altruistic motives | 4.42 | 1.57 |

It is significant to vocational counselors that only two out of the group placed aptitude first upon their lists, and only seventeen placed it second.

With respect to satisfactoriness of choice, a desire to change occupation, four years after graduation, was expressed by fourteen (28 per cent), ten of whom were in business..

Rankings of occupations according to preference if free to choose them showed the attractiveness of the field of education, the unattractiveness of the ministry and of a military career, and decisive likes or dislikes for a medical career.

*The Statistical Viewpoint in Vocational Selection.* MAX FREYD. Journal of Applied Psychology, December, 1925, Vol. 9, No. 4, pp. 349–356.

Takes issue with a recent article by Viteles on the "Clinical Viewpoint in Vocational Selection." Describes briefly the statistical approach to the vocational problem—analysis of the job, devising tests and validating the tests by comparison with ability in the job. Other factors not represented in the tests should be verified experimentally by rating scales or questionnaires and with the statistical procedure for validation that applies in the case of tests. "The psychologist's further duties are to train the examiner, make certain from time to time that the examining methods are carried out as directed and conduct further research with the purpose of bettering these methods." If the psychologist uses other factors, such as the observation of the applicant's nervousness, he should keep a record of his objective judgments of such things and compare with the occupational criterion thus using the statistical viewpoint. Such factors can be judged by rating scales and it is possible to teach the examiner or employment manager to use such scales. The clinical viewpoint probably plays a larger rôle in guidance than in selection. At present, however, it is very difficult to check the results of guidance and it is probable that the main factors in selection will have to be established first.

*Social Status of the Clerical Worker and His Permanence on the Job.* MARION A. BILLS. Journal of Applied Psychology, December, 1925, Vol. 9, No. 4, pp. 424–427.

Studies the distribution of turnover in a group of clerks by occupation of the fathers. Fifty-nine clerical workers in a life insurance company were hired during 1922, the occupation of the fathers being secured at the time, and later classified as follows:

I. Unskilled laborer
II. Semi-skilled mechanical worker
III. Skilled mechanical worker
IV. Clerical worker
V. Salesman or manager of a department in a company
VI. Proprietor of a small business
VII. Professional man (this group would include managers or owners of large business concerns but there were none in the 59 cases studied)

The classes given are what were considered to be the ranking by social status by the average clerk.

At end of 1924 an examination was made to see how many had remained with the company throughout two years. The percentages of each class remaining less than two years, are, 25, 33, 33, 40, 50, 62, 57 in the same order as above. Two explanations of the tendency are given. If a clerical worker is bettering himself socially by taking a clerical job and continuing in it, he tends to remain with the company, but if the clerical job means a demotion in social status he tends to leave the job. Or, to a boy entering a clerical job from the family of an unskilled worker the future is promising as he looks forward to a job as section or division head, whereas a boy whose father is manager of a small business does not view such a prospect as very bright.

*The Art of Helping: Through the Interview.* LUCIA B. CLOW. The Family, July, 1925, Vol. 6, No. 5, pp. 129–132.

Traces the development of family case work through the stages: (1) period of the "treatment interview" exclusively, without a basis of fact or investigation of the case; (2) period of abundant facts but ineffective use of them in diagnosis and treatment; (3) present trend toward a treatment phase employing forward looking diagnosis, case conference and utilization of community resources on behalf of the client. Points out further that whatever plan of treatment is used the critical point is the interview

between client and visitor during which plans for the family evolve.

Cites two interviews as typical of the situation met in solving family problems, with discussion of salient points. Briefly these are in the one case: (1) creation of favorable circumstances for the conference; (2) initial avoidance of the main issue until a basis of understanding had been established; (3) utilization of high spots in the client's life; (4) formulation of a tentative plan; (5) leaving next steps to the client; (6) the visitor's personality. In the second case: (1) utilization of chance opportunity for making contacts with the family; (2) a second first-interview, bringing out new facts; (3) appeal to the client's intelligence and character; (4) the visitor's personality.

Concludes with an observation on the need for adequate terminology for proper analysis of treatment interviews.

*Interviews, Interviewers, and Interviewing.* Bradley Buell. The Family, May, 1925, Vol. 6, No. 3, pp. 86–90.

Discusses the observations of the committee organized by the American Association of Social Workers to define the interview and to determine its "how" and "why." The committee formulated certain tentative principles concerning the interview.

1. The interview involves at least two persons.
2. It is distinguished from mere conversation in that there is an underlying purpose.
3. It is important to recognize the influence of the purpose of each party on the interview.
4. There are certain factors involved in the process of interviews, such as physical setting, personality of the individuals, knowledge of the situation possessed by each, etc.
5. The interview may be analyzed into the stages:
   a. Steps leading up to the interview: Formulation of purpose; specific preparation
   b. Introduction
   c. Highest point or points in the interview
   d. Conclusion.
6. There are methods for the "Control of the Interview":
   a. Establishment of confidence
   b. Definite stimulation to reach the purpose desired
   c. Recognition, evaluation and utilization of new material appearing in the course of the interview.

Stresses the point that the committee report is in the nature of an hypothesis and is formulated as a basis to further criticism, reinvestigation and ultimate formulation of principle.

*What It Means to Fire a Man.* A. J. Beatty. Forbes, September 1, 1925, Vol. 16, No. 10, pp. 727ff.

Pictures the far-reaching effects of firing a man—on the man himself, on his employer, and on society in general. The man himself loses his morale and his livelihood perhaps. His family loses immediate comforts, happiness and future prospects. The employer loses a worker, and industry may lose a producer. Society acquires a liability.

Compares cases where a man is discharged through his own fault, and shows how each case must be made an individual study.

Points out that the factors affecting the employer are far-reaching. Not only the worker's interests and those of the business concern are involved but larger ones as well. When a company fires a man it tacitly admits that it is either unable or unwilling to make job analyses and try to fit each man into the work he can do best.

*Psychiatry in Industry*—Special Number of the Monthly Bulletin of the Massachusetts Society for Mental Hygiene, February, 1926, Vol. 5, No. 2.

Gives four articles on the applications of psychiatry to industrial problems concerning the mental health and well-being of the worker; by Drs. V. V. Anderson, Elton Mayo, Augusta Scott, and H. W. Stevens.

Dr. Anderson emphasizes a thorough study of the "total situation," a pre-employment analysis including past history, physical examination, testing of general intelligence and job aptitudes, personality analysis and home conditions.

The clinical method of approach offers a sound and constructive basis for future personnel work.

Dr. Mayo describes true psychiatric industrial service and shows the necessity of this approach to the study of the human factor in industry.

Dr. Scott describes her work with the employees of the Metropolitan Insurance Company, and Dr. Stevens emphasizes not only the responsibility of industry toward the "mind" in industry, but the opportunity presented to the psychiatrist by the problems of industrial effort and reward.

*Employee Training in Kansas Department Stores.* FRANK T. STOCKTON. University of Kansas Studies in Business, No. 2, November, 1925, pp. 22. Published by the School of Business, Lawrence, Kansas.

Describes a study of the education and training of salespeople in all department stores in Kansas in cities of over 5,000 inhabitants. Thirty-seven stores made reports. Personal interviews were also used in several instances.

Takes up such topics as: educational requirements for new employees, store meetings, store libraries, store manuals, bulletin boards, store bulletins and letters, trade journals, etc.

There is a great deal of indifference on the part of salespeople toward any scheme designed to increase their efficiency, but even so many store managers have faith in all the educational work they can do. In general, men take more interest in store educational work than women. This indicates that study programs should be designed to appeal particularly to women, since they predominate. Concludes by asserting that the importance of organized training for salespeople has been increasingly recognized year by year, and that not only have educational programs proved of real use, but that retail selling is now regarded as a skilled employment of the first rank.

*Better Production by Better Light.* KIRK M. REID. Business, November, 1925, Vol. 7, No. 2, pp. 14ff.

Advocates the use of adequate and correct illumination in industrial plants, and discusses the fundamental principles as to why production and efficiency are improved by the use of better light. Charts are used to show the relation between light and time required for vision, and between time and light required for discrimination by the normal and the astigmatic eye. Still another topic considered is the effect of glare on the contraction of the pupil and the practical effect this has on the amount of illumination required for proper discrimination. Light without glare will give almost twice as much "seeing" as the same number of foot-candles from lighting units of improper design and poor arrangement. The question of cost comes in for consideration and a test in the inspection department of the Timken Roller Bearing Company is described. Length of the test was ten weeks and increase in production amounted to 12.5 per cent whereas the added lighting cost, in ratio to the payroll, was 2.1 per cent.

Gives an estimate of the annual loss in the United States to be $4,500,000,000 in lowered production and spoilage as a result of poor lighting.

Describes modern equipment available for artificial lighting in factories and gives some suggestions for proper installation under the more usual factory conditions.

*More Light for the Office.* KIRK M. REID. Business, January, 1926, Vol. 7, No. 4, pp. 18–20.

Discusses the value of good illumination and gives some measures of the comparative value of natural and artificial light for various conditions and arrangements of offices. The correct lighting of a typical office is considered, and such topics as, quantity, distribution, direct glare, reflected glare, shadows, kind of fixtures, and indirect lighting are discussed.

A comparison is drawn between the three methods of indirect lighting, full-indirect, dense semi-indirect, and regular semi-indirect, the second being perhaps the most desirable since it eliminates glare, yet gives a room the appearance of being well-lighted. The value of white paint and good use of soap and water are also touched upon.

*The Classification and Compensation Plans for the Postal Service of the United States.* Public Personnel Studies, November, 1925, Vol. 3, No. 11, pp. 312–319.

States that the postal service, though it includes almost 300,000 positions, presents only a few problems that are difficult from the classification standpoint. Existing classification and compensation plans that were enacted into law in 1920 and 1925 are something more than a mere salary scale, yet fail to meet accepted and reasonable modern standards. Defects in the classification plan consist of: (1) true classes are not recognized for large and important groups of positions; (2) there are no written class specifications and no satisfactory method for grading post offices; (3) it was enacted into law without necessary machinery to make changes except by act of Congress, resulting in administrative subterfuges and evasions on the part of postal authorities to operate efficiently.

The compensation plan is defective in that: (1) level of compensation for the lower classes of positions is high compared to other parts of the service and to industry; (2) supervisory responsibilities are not adequately recognized in the way of compensation; (3) some classes of positions are not provided with a graduated scale of compensation even though a wide range of proficiency exists, and increases of compensation for those positions are not automatic.

*The New Science of Management.* GEOFFREY C. BROWN. American Federationist, September, 1925, Vol. 32, No. 9, pp. 754–763.

States that the science of industrial management must signify a conception of management based upon accumulated knowledge as to how industry may best be conducted, and also upon the constant acquisition by observation, study, or reasoning of new knowledge of this character.

Demonstrates how management has acquired this status by first going back to the beginning of the eighteenth century and describing the "domestic system." Then one hundred years is past by and the advent and development of the "factory system" is pictured. It is here that industrial management first became at all complicated, though not at this stage being able to lay any claim to a scientific character. Many reasons for this are discussed, especially the uncertainty as to what constituted a fair day's output from workmen, and the general wastefulness of both human effort and materials.

Describes the beginning of the era of "big business" and how management became forced to depend upon exact knowledge and thus assumed a scientific character, lists the general principles underlying the new science of management, and shows how well or how poorly they are working in the various kinds of factories of the present day.

Touches upon the subject of elimination of waste through greater standardization of consumable products. Industrial democracy is referred to in a general way, and the claim made that it is the only possible solution to the problem of restoring to the workman his lost pride of craftsmanship.

*Labors' Ideals Concerning Management.* WILLIAM GREEN. Bulletin of the Taylor Society, December, 1925, Vol. 10, No. 6, pp. 241–253.

Comprises the speech of the president of the American Federation of Labor at a joint meeting of the Taylor Society and the Management Division, American Society of Mechanical Engineers, New York, December 3, 1925. Mr. Green deals briefly with the development of the position of both Management and Labor in the present capitalistic system of industry, and shows how essential trade unions are. He scores company unions, and systems of production out-put wherein the worker serves in a mechanical capacity. Trade unions may, on the other hand, give to industry and management service of great value, by furnishing the intelligence, knowledge, and training which comes through trade union affiliation.

Touches upon the ideals that Labor holds concerning Management, and says, "The workers believe that through understanding

and coöperation the best interests of all those associated with industry can be served." Then again, "It is an ideal of labor that management shall formulate and follow such wise policies as to bring to the workers the realization of high living standards, as this condition would be of benefit to both owners and workers in industry."

*Certain Limitations in the Application of Scientific Management.* Case Studies in Business, Harvard Business Review, October, 1925, Vol. 4, No. 1, pp. 106–111.

Analyzes the manufacturing processes of the Walker Piano Company, makers of high grade pianos, and cites the chief difficulties in the way of maintaining a force of highly skilled and loyal workers. Discusses what is meant by scientific management. It is that type of management which is based upon an analysis of every activity and responsibility in the system of production with the purpose of determining accurate and precise measures and methods for every kind of performance.

The analysis of the company shows that scientific management might be successfully applied to the control of inventories and to the unskilled operations. On account of the high quality of the product, however, the application of this system to skilled work is limited. Gives some reasons why this is so, and cites some other similar cases to illustrate. Beyond the point where craftsmanship is required to produce fine quality, standardization is difficult and scientific management may result in greater cost per unit and poorer quality than systematic management.

*What Are the Elements of an Effective Bonus?* J. K. Novins. Store Operation, October, 1925, Vol. 3, No. 9, pp. 12, 13, 22.

Outlines methods of figuring salaries and bonuses as worked out by enterprising retail merchants for their salespeople. The most important are:

1. Sales bonus based on sales in excess of the sales quota assigned to salespeople.
2. Bonus paid on a percentage of the salesman's yearly salary.
3. Bonus based on the increase of sales in the store, a percentage of this increase to be apportioned among the salesmen according to their individual sales increases.
4. Service bonus for non-selling help based on length of service in the store.
5. Bonus for executives based on net profits of the concern.

*Types of Women Employees Desired in Banks.* Mrs. Caroline P. Stickles. Vocational Guidance Magazine, December, 1925, Vol. 4, No. 3, pp. 123–128.

Points out the growing opportunity for women in banks, including opportunities in the more responsible official and executive positions. Type of work offered falls into three divisions, typing, adding and calculating machine work, and the more advanced work covering various kinds of bookkeeping and semi-executive work.

Indicates the beginning positions and their outlets: (1) Transit Department, through Statement and Bookkeeping to Cashier's Department; (2) Money Department, leading to teller's assistant, savings teller and payroll clerk; (3) Correspondence or Ediphone department from which officers' secretaries are chosen and stenographers for other departments in the bank; (4) Coupon Department; (5) Addressograph and Multigraph; (6) Other departments employing women—Loan, Collection, Trust, Foreign Exchange, and Real Estate.

Describes briefly the responsibilities and varieties of positions in the several departments and special qualifications needed, as for instance, tact, judgment, pleasing voice, and knowledge of routine bookkeeping for the woman at the bookkeeping information desk. General type of employee sought is "the best grade of student," "the alert, quick-thinking girl."

*An Automatic Machine For Making Multiple Aptitude Forecasts.* Clark L. Hull. Journal of Educational Psychology, December, 1925, Vol. 16, No. 9, pp. 593–598.

Does not so much describe the machine as the comprehensive system of vocational prognosis of which the machine is an integral part. The basic principles of the

aptitude forecaster were hit upon while working on an automatic correlation calculator, and the two purposes were finally achieved in one machine.

The aptitude forecaster performs its function by solving multiple regression equations. The test scores and the regression equations are both given to the machine in the form of perforated tapes, the former of paper and the latter thin metal, since its use is repeated many times.

Sketches briefly the proposed system of vocational prognosis in order to show the potentialities of the machine as a labor-saving and time-reducing device. Occupations are grouped into types and a type aptitude selected for each, the number being reduced to about 40. A youth will be furnished a forecast of his aptitude in each of the forty type occupations, in terms of a single uniform scale so as to permit ready comparisons. It is planned to reduce the forty aptitude test batteries by means of groupings and elimination of duplicates into a single test battery requiring only about 4 or 5 hours to give. Thus would be eliminated a great deal of labor. But there would still remain an enormous amount of computation in solving the 40 long regression equations and it was to do this automaticallly that the machine was designed.

*A Correlation Machine.* STUART C. DODD. Industrial Psychology, January, 1926, Vol. 1, No. 1, pp. 46–58.

Gives an explanation of the industrial uses of correlation for readers who may not be familiar with this statistical tool. Covers such topics as: use of the correlation coefficient, errors of estimate, multiple and partial correlation, regression weights, sampling, reliability, and standard deviation. Explains and discusses the solution of a formula for the arbitrary origin, that permits using the raw scores throughout instead of deviations if the assumed mean be taken at zero.

Describes six models that have been built, all of which embody the following general principles:

1. The reduction of the data to an arbitrary scale of not more than twenty group intervals in order to simplify all the multiplication and squaring processes. This grouping is generally considered sufficiently fine to keep the error due to grouping down to less than 1 per cent.

2. The use of standard revolution counters capable of algebraic summation through adding numbers when rotated in one direction or subtracting numbers when rotation is reversed.

3. The use of an arbitrary origin or assumed mean which requires the application of exact correction factors in the final formulae.

4. The conversion of numbers punched in by the operator into degrees of rotation received by the counters through laminated gear wheels with differing numbers of teeth shorn off.

5. The simultaneous summation of x and y (deviations), x squares and y squares, xy cross-products, the number of cases in the total distribution, and the number of cases or frequencies in the cells.

6. The accumulation of xy cross-products by the mechanical combination of a drum revolving x times and driving a pinion y teeth on each revolution.

Discusses possible developments, such as the construction of a curve-fitting machine. The automatic and recording correlation machine designed by Professor Clark Hull at the University of Wisconsin is also considered in its relationship to the one herein described as to the needs that each can best fill.

# Program

## MAY CONFERENCE ON EDUCATIONAL PERSONNEL RESEARCH AND STUDENT GUIDANCE

*University of Minnesota, Minneapolis*
*Friday, May 14*

9:30 a.m.

*Freshman Problems: Selection, Orientation, Educational Classification, Guidance*

Joint session with Deans and Advisers of Men, Dean C. R. MELCHER, *University of Kentucky*, presiding.

L. L. THURSTONE, *University of Chicago:* "Report on the A C E Psychological Examination for Freshmen."

K. M. COWDERY, *Stanford University:* "Selection of Entering Students."

Dean FRANCIS F. BRADSHAW, *University of North Carolina:* "A Plan for Selective Admission to State Universities."

Dean STANLEY COULTER, *Purdue University:* "Orientation."

Dean ERNEST H. WILKINS, *University of Chicago:* "Freshman Week."

G. D. STODDARD, *State University of Iowa:* "This Year's Experience with the College Placement Examinations in Approximately One Hundred Institutions."

12:30 p.m.

*Round Table Conferences at Luncheon*

Mental Hygiene—SARA M. STINCHFIELD, Chairman
Vocational Guidance—H. D. KITSON, Chairman
Psychological Methods of Measurement—A. W. KORNHAUSER, Chairman

2:30 p.m.

*Reports of Research*

**Section A.**—D. G. PATERSON, *University of Minnesota*, presiding.

MILDRED ROSENSTIEL, *Woman's Occupational Bureau, Minneapolis:* "The Case Method in Vocational Guidance."

R. B. CUNLIFFE, *College of the City of Detroit:* "Experience with Courses in Vocational Guidance."

MABELLE B. BLAKE, *Smith College:* "The Technique of the Student Interview."

J. R. DYER, *University of Kansas:* "A Hundred Interviews on the Choice of a Life Work."

H. D. KITSON, *Teachers College*, Columbia University: "Vocational Histories as an Aid in the Vocational Guidance of College Students."

J. E. BOHAN, *University of Minnesota:* "Improvement of the Marking System for the Facilitation of Personnel Research."

**Section B.**—L. J. O'ROURKE, *U. S. Civil Service Commission*, presiding.

MARGARET R. DAVIDSON, *Women's College in Brown University:* "Predictive Value of High School Rankings and Psychological Test Scores."

F. J. WEERSING, *University of Kansas:* "A Technique for Converting Letter-grades into Numerical Scores."

L. D. HARTSON, *Oberlin College*: "Language Classification Tests."

THEOS LANGLIE, *University of Minnesota:* "Placement Tests in Engineering."

J. B. MINER, *University of Kentucky:* "Intelligence Scores and Scholarship for the Same Group for Each Year in College."

ESTHER ALLEN GAW, *Mills College:* "Report on the Use of the Thorndike Examination at Mills College."

6:30 p.m.

*Dinner.* Followed by Addresses Descriptive of Personnel Administration and Research at the University of Minnesota.

President LOTUS D. COFFMAN, *University of Minnesota,* presiding.

Dean J. B. JOHNSTON: "Predicting College Achievement as a Basis for Educational Guidance."

Dean M. E. HAGGERTY: "Report on the Work of the Committee on Educational Research."

CHARLES W. BOARDMAN: "Report on the Work of the Committee of Seven on the Relations of High Schools to the University."

*Saturday, May 15*

9:30 a.m.

*The Nature and Present Status of Student Personnel Work*

Joint session with Deans and Advisers of Men, Dean H. E. HAWKES, *Columbia University,* presiding.

L. B. HOPKINS, *Northwestern University:* "The Place of the Personnel Bureau in University Organization and its Significance for Problems of the Dean."

Dean T. A. CLARK, *University of Illinois:* "The Dean's Office and Personnel Procedure."

C. R. MANN, *American Council on Education:* "Procedure in Personnel Work."

BEN D. WOOD, *Columbia University:* "Objective Measures at Work—Measurement and Classification of 50,000 Students of Modern Languages and Physics."

2:30 p.m.

*Reports of Research*

C. S. YOAKUM, *University of Michigan,* presiding.

H. A. TOOPS, *Ohio State University:* "Some Possibilities and Problems of Research of a State-wide College Association."

DOROTHY W. HOLBROOK, *Northwestern University:* "Studies of Groups of Successful *vs.* Probation Students."

EDNA HEIDBREDER, *University of Minnesota:* "Personality Trait Ratings."

A. W. KORNHAUSER, *University of Chicago:* "Some Results from the Use of a Graphic Rating Scale for Judging Students."

GRACE E. MANSON, *University of Michigan:* "An Investigation of the Standards of College Women on a Selected Group of Social Traits."

RUTH M. HUBBARD, *University of Minnesota:* "The Reliability of the Freyd Interest Blank."

MARION MYER, *University of Minnesota:* "Measurement of Scholastic Interests as Independent of Intelligence."

SARA M. STINCHFIELD, *Mount Holyoke College:* "The Importance of Speech Defects in Personnel Work."

J. B. PORTER, *Ohio University:* "Correlations of Mental Ability and Self-estimates of Self-consciousness, Accuracy, etc."

# News Notes

## PERSONNEL RESEARCH FEDERATION

### *New Members*

By action of the Administrative Board The Women's College in Brown University has been added to the Register of Approved Organizations and admitted to corporate membership in the Personnel Research Federation. Margaret R. Davidson, Vocational Secretary of the Appointment Bureau, has been named representative.

### *Activities of Member Organizations*

#### *Wellesley College*

At Wellesley College, in common with other women's colleges, the personnel work has been the outcome of the Teachers' Registry of earlier days, combined with the faculty committee for arranging lectures for vocational information. The general character of the work has been determined and limited by these origins, but in the development and practice of these activities a larger and more general need has emerged; namely, a permanent and complete record of the college career of the individual student. This has been increasingly felt for the last five years, during which the use of individual conferences has been steadily growing, the records of mental testing have been accumulating, and methods of gathering faculty judgments have been a matter of constant experiment.

The personnel work at present, as the outcome of these disparate activities, is given a larger organization than the placement office affords by the recently appointed Personnel Board. This is composed of the President of the college as chairman; the deans; the physicians; the Professor of Psychology; the Associate in the Bureau of Occupations; and the Director of the Bureau of Occupations, who is permanent secretary. The purpose of such a Board is to bring together the administrative offices, to centralize information and to initiate personnel investigation. Aside from this general organization the personnel work is especially taking form in the required interview for all students, experiments with personality ratings, and the formulation of a cumulative record card.

The interviews with the freshmen, held by the freshman dean, are educational and vocational in nature, and a careful record is kept of the information gained, to be entered ultimately upon the cumulative card. The sophomores, juniors and seniors are interviewed by the officers of the Bureau of Occupations, whose impressions are also fully recorded. The personnel rating sheets are the result of the coöperation of the Department of Psychology and the Bureau of Occupations, and ask for the evaluation of students upon the following thirteen traits: appearance, power of comprehension, initiative, alertness, reliability, commonsense, intellectual enthusiasm, memory, coöperativeness, integrity, temperament, healthiness of mental life, sense of humor.

These blanks are sent to all members of the faculty who are willing to rate their students, and a large proportion have undertaken to do so. The record card puts into permanent form the results of interviews and ratings, and at the same time is a composite of the records of the offices represented on the Personnel Board. The depository of the personnel records is the Bureau of Occupations, which thus, while keeping its old functions of placement and the giving of vocational information, emerges into a larger educational relation with the work of the college.

Wellesley has so far pursued no independent research, but is coöperating with the University of Michigan in its study of Tact by accumulating material from the Departments of Psychology and English Composition.

The problems of personnel were the subject of a conference held at Wellesley under the auspices of the Bureau of Occupations on January 29th and 30th, attended by representatives from the New England colleges for women. The program included discussions of the general development of such work in colleges of this type, and the administration of personnel as evidenced in faculty coöperation, student coöperation, work with the unadjusted student, mental tests, and in placement, self-help and the compilation of records.

The general trend at Wellesley College has been determined to a large extent by the efforts to retain some of the advantages of individual dealing and direction in the midst of a group that has outgrown the earlier informal contacts, and has been forced to depend largely upon uncorrelated records. This work here, as elsewhere, is the attempt to deal with the student individually, rather than in the mass.

*New York University*

*School of Commerce*

This summary of the several courses of instruction in personnel work at New York University, School of Commerce, is followed by a brief sketch of researches undertaken.

*Personnel Administration*, given by Dr. Henry C. Metcalf, deals with fundamental principles. It gives the scientific and human background of the personnel field—its principles and practices. It covers, broadly, employment practice, health and safety, corporation instruction and training, problems of personnel research, employee's service features, the joint relations problems, or the so-called "democratic movements" in industry.

Last year the Bureau of Personnel Administration, of which Dr. Metcalf is Director, issued *Linking Science and Industry* in the Human Relations Series, published by The Williams & Wilkins Company, Baltimore, Maryland. This year, in February, *Scientific Fundamentals of Business Administration* was issued from that press. Another volume, *Employee Representation* is just now being published. In addition, Dr. Metcalf is conducting extensive researches in private corporations and is preparing, with Mr. Ordway Tead, a new edition of *Personnel Administration*, which will come out during the summer. (Note: The Bureau of Personnel Administration is not connected in any way with New York University, although Dr. Metcalf has been associated with the University as Lecturer on Management for several years.)

*Labor and Employment Management.* This course deals particularly with methods in labor and employment management. Mr. J. D. Hackett, Labor Consultant, has charge of this class. The problems discussed are based mainly upon his own personal experience in the labor and employment management fields.

*Technique of Personnel Management.* The aim of the course is to make the student familiar with the instruments used in the practical application of the fundamental principles of personnel management. The important phases of job analysis, test standardization, interviewing, placement, transfer, promotion, discipline, rating systems, salary administration, incentives, training, etc., are illustrated by practical problems from the administrative field of business. Students are encouraged to do individual research work and to present their problems for solution. Mr. H. B. Bergen, Manager of the Personnel Department of H. L. Doherty & Company is in charge of the class.

*Personal Management.* This course has been developed during the past two years by Mr. N. L. Hoopingarner, Lecturer on Business Psychology and Management, with the assistance of Mr. F. W. Lawson, Director of the Bureau of Employment at New York University. Already much valuable data have been accumulated which has furnished the basis for research on problems of personal development and vocational guidance of students. Results to date indicate that merely advisory methods for personal development and vocation guidance are not adequate, but that intensive work under supervision such as can be accomplished through the vehicle of an organized course furnishes a proper nucleus. Vocational guidance is thereby given a recognized status, the student taking it as

he would any other course in the University and receiving a background for applying what he receives. Continuous supervision and follow-up, while not fully organized as yet in connection with the course, is being developed and will be coördinated with the Bureau of Employment and extra-curricular activities. Approximately one hundred students have taken the course each year it has been given, a number of whom have been college graduates of several years' standing who have felt the need for such help. The general purpose and scope of the course as stated in the catalog may be of interest.

"The purpose of this course is to help the student in organizing himself and his efforts to best advantage, both in his studies and in his business. The principles of psychology and management are brought to bear in a concrete and practical manner on the individual's own personal problems. The importance of personal qualities as a factor in the successful application of knowledge and experience is emphasized.

"The natural abilities, traits, capacities and experience of each student will be analyzed and evaluated and he will be assisted in adjusting himself to the type of work for which he is best fitted."

The course is conducted in the following manner:

A. Lectures and discussions each class period dealing with methods of study, how to think, the development of personality, leadership, etc.

B. The application of tests and interest and aptitude analyses for the purpose of evaluating abilities and to form the basis for recommendations. The Hoopingarner Tests for Executive and Business Ability are used.

C. Occupational Group Conferences are conducted in coöperation with the Employment Bureau to give the student occupational information.

D. Personal conferences with each student to take up the results of his tests and discuss his problems specifically.

E. Assigned readings and reports made by students.

F. Each student is required to study the line of work which he is planning to enter and write a term paper on its possibilities, requirements, advantages, disadvantages, and so on; check his own fitness for the work, and make up a program of what he will need to do to assure himself of a reasonable chance of success in that field. This term paper crystallizes the results of the course for the student, and the data obtained furnish material for research.

As a result of the course described, a special course along similar lines was started in 1925–26 for freshmen only. While not a required course for all freshmen, those students who have ability but who are deficient in training or background are required to take it in order to orient them properly to college life and help them in getting started. It is expected that the course will conserve many students who would otherwise not be able to carry the work. While the vocational problem is included, more attention is given to methods of study, how to use the library, and other immediate problems. The results indicate that it is meeting a real need.

*Study of Occupational Information Needs*

Forms, supplied to all students at registration time asked those who felt a special need for information concerning various occupations to so advise the Bureau of Employment. Because of our limited ability to render such service the students were asked not to request it unless their problems were acute. Five hundred and twenty-five returned the forms. Of these, 327 definitely registered for counsel and expressed their desire for information in occupations as follows:

| | |
|---|---|
| Accounting | 86 |
| Banking and Finance | 37 |
| Commercial Teaching | 37 |
| Advertising | 26 |
| Foreign Trade | 18 |
| Law | 18 |
| Sales | 17 |
| Manufacturing | 12 |
| Real Estate | 12 |
| Journalism | 10 |
| Government Service | 6 |
| Building Construction | 5 |
| Merchandising | 5 |

| | |
|---|---|
| Academic Teaching | 4 |
| Public Service Companies | 4 |
| Social Service | 4 |
| Insurance | 3 |
| Purchasing | 3 |
| Agriculture | 2 |
| Research | 3 |
| Ministry | 2 |
| Secretarial | 2 |
| Traffic Management | 2 |
| Correspondence | 1 |
| Drama | 1 |
| Fine Arts | 1 |
| Engineering | 2 |
| Office Management | 1 |
| Natural Resources | 1 |
| Personal Business | 1 |
| Publishing | 1 |

In each case where the number is greater than 12 the students were called together in a group for discussion under competent leadership. The others were counseled individually.

*Study of proportion of expenses earned*

Representative statistics have been gathered from students in the School of Commerce at one registration period showing the numbers of day and evening students employed on both full time and part time bases, what proportion of their expenses they earn and what vocations they are primarily interested in.

VOCATIONAL GUIDANCE AT MICHIGAN

Dr. C. S. Yoakum, Professor of Personnel Administration, University of Michigan, has been appointed executive officer of a University Committee on Vocational Guidance and Placement. This committee will begin to function at the beginning of the next school year. It is probable that most of the first year will be devoted to certain research problems.

FORTHCOMING MEETINGS

*American Management Association, Production Executives' Division*

The next conference of the Production Executives' Division will be held at Silver Bay, Lake George, New York, June 30 and July 1 and 2. The topic to be discussed is The Supervisory Forces: Selection, Development, Compensation and Rating.

*American Council on Education*

The Ninth Annual Meeting of the American Council on Education will be held in the National Research Council, 21st and B Streets, N.W., Washington, D. C., May 7 and 8, at 10 a.m.

Of particular interest to readers of the JOURNAL will be a report from the Committee on Personnel Methods, under the chairmanship of Dean H. E. Hawkes; and a discussion on National Coöperation of Colleges and Industries in Education, based on recent articles in the Educational Record and reports which precede the discussion. These will be given at the Friday morning session.

*National Association of Foremen, Annual Convention*

The annual convention of the National Association of Foremen will be held in Springfield, Ohio, May 25, 1926. This will be a one-day session from 9:00 a.m. to 10:00 p.m. Speakers of national reputation will present subjects of vital interest to foremen, superintendents and personnel directors. Reservations may be sent to V. H. Whipple, Secretary, 105 West Third Street, Dayton, Ohio.

NEW JOURNAL OF THE PSYCHOLOGICAL INSTITUTE OF THE UNIVERSITY OF JENA

The Jena Contributions to Child and Educational Psychology (Jenaer Beiträge zur Jugend- und Erziehungs- Psychologie), the organ of the Psychological Institute of the University of Jena, is a new periodical, published by Julius Beltz, Langensalza. The numbers will appear irregularly and may be purchased separately. Number 1, undated, was issued in the fall of 1925.

The Institute, established in the summer of 1923, is of interest to personnel workers inasmuch as developing personality is the theme around which it expects to coördinate its work. The plan of the investigations contemplates extensive researches into

capacities of individuals, effects of environment, and changes incident upon the stages of development. Recognition of the problem of individuality and personality in this formal way is unique in the formation of institutes. Personnel workers as well as psychologists and educators will be interested in the future publications which present the results of the work begun under this plan.

The first number contains a description of the location of the new Institute, its equipment, and a somewhat detailed statement of the presuppositions and argument which underlie the purposes of the plan. This statement also discusses the sources of material, methods of work, and the differences between the Institute's objective and that of the usual psychological laboratory.

"Personality Conceptions on the Basis of Descriptions of Personality," by Helmut von Bracken, forms the main portion of the first number. After a historical review of methods used in, and purposes of, descriptions of personality, the author experimentally tests two types, the free description and the systematic description. The first type seeks to set out the personality of a given individual so that he may be recognized. The second has all degrees of completeness but endeavors to classify qualities so that the same scheme may be used to set over against it the differing qualities of any number of persons. Results of the latter are reducible to psychological profiles, if desired.

The problems investigated deal with the relative significance of these two main types of description. In general, the free description leads more easily to identification and to the discovery of characterizing traits and is more easily understood as a characterization of the personality. The schematic description presents more items of information, but is very difficult to identify and does not give a satisfying picture of the personality of an individual. By means of several experimental attacks, the author shows that personality is not a sum total of numbers of trait items. The whole article is an interesting demonstration of this fact. Ideas of a person are not gained merely by summing up separate impressions.

A bibliography of about 120 titles is given, practically all in German.

# IMPORTANT INFORMATION for SUBSCRIBERS

This Journal has heretofore been sold on the *volume* basis.

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# Stability of Men and Women Office Workers

By Harold B. Bergen, *Henry L. Doherty and Company, New York*

*In the experience of one company women employees do not have a higher turnover than men. The reasons which Mr. Bergen gives for this fact suggest vistas of socially valuable studies on this topic which could readily be carried out by those who have access to such data.*

DO WOMEN quit their jobs more frequently than men? "Of course they do," would be the reply of many chief executives, department heads, and personnel men, if questioned on this subject, giving as reasons for this opinion the belief that women leave to get married, that they are temperamental, and that they easily become dissatisfied with receiving lower pay than men receive. In fact, the allegation that women are less stable than men is often advanced as the ground for paying them less.

It is worthy of remark that the employers who make this complaint about women rarely furnish figures with which to support their statements. Now it is a principle of modern personnel management that off-hand statements and expressions of opinion are unreliable guides to personnel practice. The truth should be determined by means of investigations carried on with scientific precision. In an attempt to obtain objective data concerning this question, the writer made a study[1] of the service records of 400 "white collar" workers who resigned consecutively during 1923, 1924, and 1925 from the employ of a large financial house in New York City. The group included the regular force of office boys, junior clerks, senior clerks, ledger clerks, file clerks, bookkeepers, correspondents, typists, stenographers, secretaries, etc., but excluded a comparatively large number of temporary clerical workers who were hired for emergency jobs of short duration.

The resignations were grouped according to sex and year resigned, and the average number of weeks worked by the members of each group was then calculated. In addition, the percentage of resignations was calculated on the basis of the number of resignations for the year divided by

[1] The guidance of Prof. H. D. Kitson, Teachers College, Columbia University, who suggested this study, is gratefully acknowledged.

the average working force. Table 1 shows the results of these calculations.

RESULTS AND CONCLUSIONS

1. The figures in table 1 show that although in 1923 the percentage of resignations was greater among women than among the men, in 1924 the difference decreased and in 1925 there were proportionately *fewer* resignations among the women than among the men, the ratio being 68 to 100.

TABLE 1

*Per cent of resignations and average number of weeks served*

| | AVERAGE WORKING FORCE | NUMBER RESIGNATIONS | PER CENT RESIGNATIONS | TOTAL WEEKS SERVED | AVERAGE WEEKS |
|---|---|---|---|---|---|
| **Men** | | | | | |
| 1923 | 462 | 88 | 19 | 7,096 | 81 |
| 1924 | 461 | 48 | 10 | 3,225 | 67 |
| 1925 | 591 | 129 | 22 | 9,705 | 75 |
| | | 265 | | 20,026 | 76 |
| **Women** | | | | | |
| 1923 | 188 | 56 | 29 | 3,835 | 68 |
| 1924 | 213 | 36 | 17 | 4,151 | 115 |
| 1925 | 281 | 43 | 15 | 5,145 | 120 |
| | | 135 | | 13,131 | 97 |

2. An explanation of this increase in steadiness on the part of the women employees might be found in the fact that better methods of personnel administration were developed, which constituted improvements in the status of the women workers. The developments include a greater centralization of the functional control of personnel activities, the standardization of psychological tests for the occupations of which the vast majority of women employees are incumbents, an improvement in the method of job analysis for these occupations, and an organized attempt to eliminate prejudices against women employees, with a view to increasing the lines of promotion open to them.

3. These changes may have made their positions more attractive to them so that they tended to hold them longer. It should be pointed out however, that conditions similarly favorable to the men have prevailed for some time. Accordingly, it would seem that when men and women are placed on the same status in this type of organization, the women resign less frequently than the men.

4. When the length of service of the employees who resigned is examined the women appear in still more favorable light. In 1924 and 1925 they served on the average a longer time than the men, with a ratio of 150 to 100.

5. It is interesting to note that the number of resignations among both sexes is smaller in 1924 than in the other two years. This is probably a reflection of the slight stringency affecting business in 1924. The number of positions in the business world was smaller and workers, therefore, held to the jobs they had.

6. In explanation of the main finding of this investigation, *that women are not less stable than men*, it might be observed that the circumstance that was formerly regarded as woman's chief barrier to long service in business, marriage, is no longer acting as a barrier. Women in business get mar-

ried, but they do not necessarily resign afterward. They keep working. Accordingly, when measured by the two indices used in this investigation, frequency of resignation and length of service, they appear even more desirable than men.

(*Manuscript received March 12, 1926*)

# Abilities Necessary in Effective Retail Selling and a Method of Evaluating Them

By Helen E. Cook, *A. I. Namm and Sons, Brooklyn, N. Y.*, and Grace E. Manson, *University of Michigan*

*The selection of retail sales people has long been a thorn in the side of the personnel research worker. In contrast retail sales methods have been much more amenable to scientific study. The present investigation not only indicates the soundest statistical procedure in problems of this sort, but also presents results of immediate practical use to department store executives in obtaining judgments of the effectiveness of their sales clerks.*

THIS investigation is the outgrowth of a question raised by the personnel director of a large department store, namely, "Should we not include and emphasize the same traits and abilities on our shopping report blanks (used by service shoppers), rating-scales (used by buyers and assistant buyers in evaluating the services of sales clerks), and training department courses of study?" Then the training given to salespersons would stress ways of developing those traits and abilities which shoppers are asked to look for and upon which executives rate. By such a procedure, the shopping reports and the executives' ratings of salespeople could be used as a check upon the efficiency of the training department and as indicators of points upon which certain salespeople needed additional training. This desirable coördination could be brought about only by maintaining a consistent terminology throughout the entire program. The present study grew out of the conviction that before a consistent terminology could be established, it was necessary to determine what traits and abilities are most essential to successful retail selling, also, what is the relative importance of the group of traits and abilities considered essential.

## INTERVIEW METHOD

The first step taken was to obtain a list of traits which were considered important for retail salespeople. Throughout this study the customer is considered the final judge of whether or not the selling episode is a satisfying one, since she is the only one who is able to express the feeling tone developed towards the clerk by the quality of the services rendered. Amount of sales is only an indirect measure of whether the customer liked or did not like the personality and selling technique of the salesperson.

The method used in obtaining the list of traits and abilities was one previously used by Dr. W. W. Charters and members of the Research Bureau for Retail Training staff.[1] Miss Julia Mockett, a member of the Bureau staff, undertook this part of the investigation. From previous work of a similar character it had been found that the interview method was more satisfactory than the questionnaire method for obtaining information of this type. It had also been learned that after ten interviews the six most observed traits would be mentioned.

Miss Mockett, therefore, interviewed ten customers selected as representative of the more critical buying public. Each customer interviewed was asked nine questions. Some questions were designed to bring out desirable traits, and others to bring out undesirable ones. The customers' replies were written down exactly as given. The following questions were used in interviewing:

1. When you go into a store to shop, what qualities or traits of personality in a salesperson appeal to you most?
2. What is the difference in your mind between a salesperson and a clerk?
3. Do you have a favorite salesperson to whom you always go in a store? Why is she your favorite? What things does she do that you especially like to have done?
4. If you were responsible for the training of this salesperson, is there any quality you would try to develop in her which would make her better still?
5. What things can a salesperson do for you that please you very much?
6. What sort of things irritate you in a salesperson?
7. After you have been in a store and have been waited on by a salesperson, did you ever make up your mind never to go near her again? Why did you resolve to avoid her?
8. Do you think the salespeople in different departments need different requirements?
9. Think of some salesperson to whom you have gone for some time. How has she improved?

The answers to these questions were translated into trait-terms. Eight traits were mentioned frequently. These, in order of frequency of mention, were: Interest in customer; merchandise information; display of merchandise; interest in work; courtesy; alertness; appearance; and ability to size up customer. The last three were mentioned about the same number of times.

We had decided for practical reasons to limit our intensive study to five traits. These five traits were to be analyzed further in order to determine their relative importance. The technique used was that of weighting rating scale scores by use of the regression equation. The five traits used in the rating scale were: Interest in customer; merchandise information; display of merchandise; courtesy; and alertness. Interest in the work, which ranked fourth in Miss Mockett's list, was eliminated because it was thought that it would be difficult for a customer to make a judgment on this trait from observation of a salesperson in a selling situation only. Alertness, ranking sixth, was chosen in its place.

[1] Charters, W. W.: *A Technique for Trait Analysis.* Journal of Educational Research, 1924, Vol. 10, pp. 95–100.

## Rating Scale

READ DIRECTIONS CAREFULLY:

Rate the total sale on the scale below before attempting to rate the salesperson in any of the traits that follow.

Put a check-mark on the horizontal line at the place which will indicate your opinion of the sale.

You do not have to put your check at the point directly above any of the descriptive phrases. You may consider the sale to rate somewhere between two of these descriptions, therefore, you may place your check at any place on the line.

OPINION OF THE TOTAL SALE

| | | | | |
|---|---|---|---|---|
| Service exceptional and gratifying | Service satisfactory and pleasing | Service commonplace and colorless | Service unsatisfactory and annoying | Service wretched and exasperating |

In rating the salesperson on the traits that follow, consider only one trait at a time. Disregard all the other traits until you have put your check-mark on the line.

Remember, you do not have to put your check directly above the descriptive phrases. You may place your check at any point on the line that will indicate your exact rating of the salesperson on that trait.

*1. Interest in customer*

| | | | | |
|---|---|---|---|---|
| Salesperson anxious to meet all the customer's needs | Salesperson wants to assist customer | Salesperson willing to satisfy customer | Salesperson indifferent to customer's interests | Salesperson's attitude irritatingly devoid of personal element |

*2. Merchandise information*

| | | | | |
|---|---|---|---|---|
| Knows nothing about merchandise, not even stock content | Can display merchandise but knows only the price | Can give essentials, as price, size, width, etc. | Can answer usual questions asked by customer | Tells important points about merchandise |

*3. Display of merchandise*

| | | | | |
|---|---|---|---|---|
| Displays all merchandise bearing on request | Displays a limited range of merchandise | Brings out articles one by one as specifically asked for | Displays only original article asked for | Makes no effort to show any merchandise |

*4. Courtesy*

| | | | | |
|---|---|---|---|---|
| Rude. Is insulting or impudent to customer | Civil. Abstracted yet does nothing to which customer can take exception | Polite. Is respectful Acts in usual conventional manner | Pleasant. Considerate of customer and attentive | Polished. Forgets self, thinks only of customer's pleasure |

*5. Alertness*

| | | | | |
|---|---|---|---|---|
| Energetic and enthusiastic. Eager to have sale progress with little loss of time | Active. By quickness of movement allows sale to progress with little loss of time | Deliberate. Moves about at even rate. Neither speeding up nor delaying progress of sale | Plodding. Moves slowly, slightly retarding progress of sale | Inert. Retards progress of sale because of lack of activity |

FIG. 1

### GRAPHIC RATING SCALE

A graphic rating scale having five described steps was formulated for each of the qualities chosen. A set of instructions for using the scale was made and placed upon the first sheet. Below the directions was placed the scale for rating the "Total Sale." The scales for rating the five traits were placed on the second sheet. The desirable phase of the trait was not always at the same side of the sheet, on some traits the scale ran from left to right, and on others from right to left. This arrangement used by Freyd[2] was employed in the hope that the rater might be made to pause and think back to the behavior of the salesperson she was rating. A copy of the rating scale used is shown in figure 1.

### SUBJECTS

One hundred and fifty salespeople in selling situations were rated by the use of this scale. The raters were divided into two groups. Eight professional shoppers rated seventy-five sales episodes and seven representative customers rated another seventy-five sales situations. The representative customer group was representative in the sense that it included cultured persons of moderate means. This is the type of person who shops carefully in the higher grade department stores. The use of the rating scale was explained in detail to each rater.

### STATISTICAL METHOD

A total of 150 rating sheets were thus obtained on each of which was recorded a rating for each of the five traits and for the total selling experience. The rating score was in each case the millimeter distance from the unfavorable end of the scale to the point checked. The line upon which the ratings were made was 180 millimeters in length.

In table 1 will be found the mean rating given in each trait by each group and also the standard deviation of the distribution. The size of the class interval in which sigma is expressed was fifteen scale units. A normal probability curve superimposed upon the base line of 180 millimeters, with a mean at the center of the lines and the same number of class intervals would have a standard deviation of 1.8 class intervals. In comparison with this normal curve, it is seen that in both groups and upon all traits the tendency is to rate above the average and to scatter the ratings, thus causing large standard deviations. It is also interesting to note that the professional shoppers were less critical

TABLE 1

*Means and standard deviations of ratings*

| TRAITS | RATED BY PROFESSIONAL SHOPPERS | | RATED BY REPRESENTATIVE CUSTOMERS | |
|---|---|---|---|---|
| | Mean | Standard deviation | Mean | Standard deviation |
| Total sales experience | 118 | 2.3 | 104 | 2.5 |
| Interest in customer | 108.8 | 2.7 | 98.8 | 2.6 |
| Merchandise information | 112.8 | 2.7 | 102.4 | 2.8 |
| Display of merchandise | 112.4 | 3.3 | 104.4 | 2.8 |
| Courtesy | 104 | 2.5 | 91 | 2.7 |
| Alertness | 104 | 2.6 | 95 | 2.5 |

[2] Freyd, Max: *The Graphic Rating Scale.* Journal Educational Psychology, 1923, Vol. 14, pp. 83–102.

and gave on the average higher ratings than the representative customer group.

In tables 2 and 3 are given the correlations between ratings on each trait and the opinion on the total sale, also intercorrelations between traits. The rating upon the total sale is considered the criterion.

The reader will notice that the coefficients of correlation between each of the qualities and the opinion on the total sales are high. Correlations of 0.60 and above are sufficiently large to warrant the statement that salespeople having high scores on each of these qualities are apt to be giving satisfying service to customers. Or stated in other terms these are traits which customers deem important in salespersons.

The next step, according to the planned procedure, was to find the relative importance of each of these traits in determining a satisfactory sales experience. The multiple regression equation gives this information. The same information is also given by the partial coefficients of correlation. We are also anxious to know what a rating on each of these items contributes in the equation which forecasts satisfactory service, and if a weighted combination of all items is more efficacious in prediction than any of the items taken alone. This question is answered by ascertaining if the coefficient of multiple correlation ($R$) is greater than any of the correlations between single items and the criterion. The regression equation for

TABLE 2

*Correlations of ratings by professional shoppers with criterion, and intercorrelations of traits*

| | INTEREST IN CUSTOMER | MERCHANDISE INFORMATION | DISPLAY OF MERCHANDISE | COURTESY | ALERTNESS |
|---|---|---|---|---|---|
| 1. Total sales | 0.85 | 0.65 | 0.76 | 0.78 | 0.79 |
| 2. Interest in customer | | 0.67 | 0.80 | 0.80 | 0.73 |
| 3. Merchandise information | | | 0.73 | 0.80 | 0.70 |
| 4. Display of merchandise | | | | 0.83 | 0.70 |
| 5. Courtesy | | | | | 0.76 |
| 6. Alertness | | | | | |

TABLE 3

*Correlations of ratings by representative customers with criterion, and intercorrelations of traits*

| | INTEREST IN CUSTOMER | MERCHANDISE INFORMATION | DISPLAY OF MERCHANDISE | COURTESY | ALERTNESS |
|---|---|---|---|---|---|
| 1. Total sales | 0.75 | 0.63 | 0.66 | 0.68 | 0.53 |
| 2. Interest in customer | | 0.59 | 0.54 | 0.77 | 0.65 |
| 3. Merchandise information | | | 0.53 | 0.59 | 0.68 |
| 4. Display of merchandise | | | | 0.66 | 0.70 |
| 5. Courtesy | | | | | 0.56 |
| 6. Alertness | | | | | |

the professional shopper group was found to be:

$$X_1 = 0.18X_2 - 0.06X_3 + 0.08X_4 + 0.08X_5 + 0.30X_6 + 57$$

when $X_1$ = rating on total sale
$X_2$ = rating on interest in customer
$X_3$ = rating on merchandise information
$X_4$ = rating on display of merchandise
$X_5$ = rating on courtesy
$X_6$ = rating on alertness

The multiple $R$, the highest possible coefficient of correlation for the weighted battery was $R = 0.87 \pm 0.02$.

The regression equation for the representative customer group follows:

$$X_1 = 0.53X_2 + 0.28X_3 + 0.40X_4 - 0.08X_5 - 0.35X_6 + 21.4$$

when $X_1$ = rating on total sale
$X_2$ = rating on interest in customer
$X_3$ = rating on merchandise information
$X_4$ = rating on display of merchandise
$X_5$ = rating on courtesy
$X_6$ = rating on alertness

The multiple $R$, the highest possible coefficient of correlation for the weighted battery, was $R = 0.85 \pm 0.02$.

## RESULTS

Examination of the two equations brings out interesting differences in attitude which the writers did not anticipate when the two groups were formed. The ratings made by the two groups were kept separate with the idea in view that one group would serve as a check and would verify the results found in the other group. Instead of this we found that the standards of excellence of the two groups are quite different. The two qualities weighted the heaviest by the professional shoppers are alertness (examination of the rating scale will show that this trait is defined in terms of the speed with which the sales episode progresses) and interest in customer. Display of merchandise, courtesy, and merchandise information are of about equal importance, except that a small negative weighting is given to merchandise information. This latter is evidently a time consuming process and the professional shopper is "eager to have the sale progress with little loss of time."

The representative customers' standards of importance are according to the regression equation: (1) interest in the customer, (2) display of merchandise, (3) alertness, (4) merchandise information, (5) courtesy. The representative customer wants a display of interest, she wants to be shown the merchandise, and she wants to have a certain amount of information given her. She does not want to be hurried at the expense of these other salesmanship qualities. Courtesy as a thing of itself apart from its expression through interest and the other qualities, is of little importance; in fact effusiveness is a detriment. The partial correlations which support and further elaborate the weightings of the regression equation are given in tables 4 and 5. Partial correlations show the relationship between any

one quality and the criterion when the influence of the other factors is eliminated. Indirectly the partial correlations show the ability of the raters to keep certain of the qualities as separate entities. For example, if the judgments on individual traits were not influenced one by the other, the zero order correlations (correlations between individual items and the criterion) would remain constant. Also intercorrelations of the zero order would be negligible. Examination of the tables of partial correlations shows that correlations become lower as more and more items are held constant. However, some traits have maintained their high correlations better than others. Thus the professional shoppers have kept alertness and interest as the most distinct entities, while the representative customers have kept interest, alertness and display of merchandise relatively free from overlapping. It is also to be noted that the representative customer group has on the whole been better able to keep the items on the rating scale free from overlapping than have the professional shoppers.

TABLE 4

*Relation of the criterion to each independent variable when the influence of other variables is kept constant*

Professional shoppers

| | | | | |
|---|---|---|---|---|
| $r_{12.0} = 0.85$ | $r_{13.0} = 0.65$ | $r_{14.0} = 0.76$ | $r_{15.0} = 0.78$ | $r_{16.0} = 0.79$ |
| $r_{12.3} = 0.54$ | $r_{13.2} = 0.20$ | $r_{14.2} = 0.25$ | $r_{15.2} = 0.31$ | $r_{16.2} = 0.44$ |
| $r_{12.34} = 0.36$ | $r_{13.24} = 0.10$ | $r_{14.23} = 0.18$ | $r_{15.23} = 0.24$ | $r_{16.23} = 0.40$ |
| $r_{12.345} = 0.28$ | $r_{13.245} = 0.01$ | $r_{14.235} = 0.09$ | $r_{15.234} = 0.18$ | $r_{16.234} = 0.40$ |
| $r_{12.3456} = 0.21$ | $r_{13.2456} = -0.08$ | $r_{14.2356} = 0.12$ | $r_{15.2346} = 0.09$ | $r_{16.2345} = 0.37$ |

TABLE 5

*Relation of the criterion to each independent variable when the influence of other variables is kept constant*

Representative customers

| | | | | |
|---|---|---|---|---|
| $r_{12.0} = 0.75$ | $r_{13.0} = 0.63$ | $r_{14.0} = 0.66$ | $r_{15.0} = 0.68$ | $r_{16.0} = 0.53$ |
| $r_{12.3} = 0.60$ | $r_{13.2} = 0.52$ | $r_{14.2} = 0.45$ | $r_{15.2} = 0.24$ | $r_{16.2} = 0.09$ |
| $r_{12.34} = 0.53$ | $r_{13.24} = 0.34$ | $r_{14.23} = 0.36$ | $r_{15.23} = 0.12$ | $r_{16.23} = -0.22$ |
| $r_{12.345} = 0.50$ | $r_{13.245} = 0.34$ | $r_{14.235} = 0.34$ | $r_{15.234} = -0.02$ | $r_{16.234} = -0.48$ |
| $r_{12.3456} = 0.62$ | $r_{13.2456} = 0.40$ | $r_{14.2356} = 0.49$ | $r_{15.2346} = -0.16$ | $r_{16.2345} = -0.51$ |

## DISCUSSION OF RESULTS

The writers are of the opinion that the graphic rating scale technique is of considerable value in occupational analysis, especially when ratings are made of real situations in the occupation under consideration. The advantage of this method lies in the fact that it centers the attention of the raters upon persons in a series of concrete situations rather than in hypothetical or generalized situations, and that it rests upon the sound psychological principle that the interests and attitudes of the raters are important determiners of the elements in the total situation which are attended to, and emotionally reacted to. Since the shoppers are, as a rule, unacquainted

with the salespersons, they do not have a preformed general attitude toward the persons they are rating.

Additional evidence that the attitudes and interests of the raters are of great importance is on hand but cannot be reported on in detail at this time. Thirteen members of the Retail Bureau class made a total of 125 shoppings using this same graphic rating scale. The quality which was given the most emphasis by this group was courtesy. Readers familiar with the course of study at the Bureau and with the emphasis given this trait by Dr. Charters in both his class work and researches will not be surprised that this trait was given so much attention by the class when making ratings. In fact, the writers believe that carefully constructed rating scales could be used to measure effectiveness in teaching, especially in courses where practical situations could be found to rate, as for example, public speakers for classes in public speaking, class-room teachers for courses in principles of teaching.

As is always the case in a preliminary experiment of this kind, caution should be taken in using the results, especially the statistical weightings in their present form, in any specific department store. The number of selling situations evaluated is not great enough for final evidence, especially since they were divided into two groups. The probable errors are small in relation to the size of the correlation coefficients, but the selection of the two groups of judges, professional shoppers and representative customers, may not have been a random one. A personnel director would have more assurance of accuracy if a new regression equation were developed from shoppings made in his own store.

## CONCLUSIONS

We believe that any large department store could use this rating scale with a great deal of value to itself. The five abilities included are unquestionably important ones for successful department store selling. The interview and rating scale methods have verified one another. We should recommend that the rating scale be used by professional shoppers and a larger group of representative customers of known social-economic backgrounds. The scale is not difficult to use and could be easily demonstrated to a college club or a church society. It would be advisable to keep such shopping groups separate and then solve the regression equations for proper weightings. It might be practical to concentrate upon one or two departments in order to keep as many variables constant as possible. The weighted rating scale scores, supplemented by the descriptive accounts of the sales episodes, would be valuable objective material for the personnel office. Service shopping is rapidly becoming an effective function of the personnel office. It is a continuous activity. Service shopping reports are slowly accumulating for all salespersons. When these reports are both quantitative and descriptive, valuable records are available for each salesperson. Total weighted scores and scores on individual qualities give the personnel department definite means for differentiating their sales force.

The descriptive accounts which accompany the ratings give specific reasons for low or high scores.

The graphic rating scale, although in no wise ideal, offers a method for (1) determining the qualities essential in salespeople and their relative importance, (2) recording quantitatively the abilities of various salespersons in selling situations, and (3) checking the differences in attitudes of special groups of shoppers such as professional shoppers, college women, etc. The value of the graphic rating scale to the educational department is increased when it is supplemented by a descriptive account of the selling episode upon which the rating was made.

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# Clerical Test Scores and Schooling

## An Insurance Company's Experience

By

William F. Dobbins, *Fourth Vice President, With the Assistance of Elizabeth J. Steele and Florence DuBois, Metropolitan Life Insurance Company*

*The Metropolitan Life Insurance Company was a pioneer in the adoption of objective standardized methods of examination of applicants for clerical positions. So far as the Editor is aware, it was the first company to retain a psychologist—Dr. E. L. Thorndike—as expert in the preparation of such an examination.*

*In this article Mr. Dobbins and his collaborators publish a description of the mental examination adopted in 1919, together with scoring instructions, norms, and comparisons of the performance of men and women and of groups with different educational backgrounds.*

THE Metropolitan Life Insurance Company employs at its Home Office in New York City a clerical force of more than seventy-five hundred persons. Several factors are considered in selecting from the applicants those who give most promise of becoming desirable employees. Among these factors are mental ability, physical fitness, education, rating of references, personal appearance, and for some positions, previous business experience. As an aid in the selection of clerical employees, the use of objective mental tests has been developed over a period of several years. Personal qualifications are judged before the candidates are allowed to take the test, and only those who are judged to be acceptable on this ground are admitted to the psychological examination.

The information supplied by the test is then used with the other available information, to aid in selecting the most promising from among the applicants under consideration. Since both demand and supply fluctuate from time to time, no definite minimum qualifications other than a score of 60 on the test are prescribed; but due consideration is given to ratings and other data, as well as test score, as indicators of probable usefulness to

the Company. It is realized that the tests give information regarding only a limited number of the qualifications which desirable applicants should have.

### APPLICANTS FROM NEW YORK SCHOOLS

During the year 1922, the tests were given to 4,610 applicants. A study of the results of the tests for that year reveals certain facts regarding the mental ability and knowledge of the applicants, which should interest those concerned with the work of the schools with their human material and with the utilization of the product in business.

The applicants were almost exclusively from greater New York; only a negligible proportion of the total number received their education elsewhere.

Applicants with public school training only were 70.6 per cent of the total; with parochial school training only, 15.2 per cent; private school training only, 0.4 per cent, and training in foreign schools, 1.7 per cent. The remaining applicants reported training as follows: public school and parochial, 9.9 per cent; public school and private, 1.2 per cent; parochial and private, 0.2 per cent; unclassified, 0.8 per cent.

Because of the large number of applicants examined, the young men and women of this group may be considered as rather a fair sample of the product of the schools of the metropolitan district, according to the amount of schooling they have received.

The tests were adopted by the Company in accordance with the development of tests of mental ability in military and civilian life, and the apparently successful use of tests in many fields of business. This development has been rapid and widespread in recent years. Its entire history in the United States covers less than thirty years.

Progress in this field has been so rapid and so widespread that it is impossible to mention the numerous investigators in universities and foundations and in the employ of commercial organizations with well developed personnel departments whose work has been of prime value. Recent work of special interest, because of the large number of applicants examined, is the use of group intelligence tests in examining applicants for general clerical work under the United States Civil Service Commission.

### MENTAL ABILITY TEST NOW USED

Certain tests of clerical applicants were used by the Metropolitan Life Insurance Company as early as 1906. At that date they consisted of tests in spelling and simple arithmetic. About 1914, tests for clerical work were devised by E. L. Thorndike especially for this Company, and were used with occasional slight changes until 1919. In that year, the test now in use was adopted. It was compiled in the offices of the Company from the original material prepared by E. L. Thorndike and from the Clerical Examination prepared by L. L. Thurstone and used with his permission. Certain questions were designed to

test mental alertness and ability to follow directions; others tested skill dependent upon training. The difficulty of the tests and the scoring rates were determined by the ability and knowledge considered necessary to perform simple clerical work in an insurance office.

tions are made to the speed score, as follows: For scores in the interval 60–75 minutes, 2 points added for each minute less than 75. For scores of less than 60 minutes, 30 points added for the interval 60–75 minutes, and 1 point added for each minute less than 60.

| PARTS OF MENTAL TEST | WEIGHTS IN SCORING FOR ACCURACY | POINTS DEDUCTED IN SCORING FOR ACCURACY |
|---|---|---|
| 1. Definitions | 10 | 1 for error or omission |
| 2. Marking unlike numbers and unlike names | 10 | 1 for error or omission |
| 3. Marking misspelled words | 10 | ½ for error or omission |
| 4. Marking certain letters | 5 | ¼ for error or omission |
| 5. Digit-letter substitution | 5 | ½ for error or omission |
| 6. Classification | 15 | 1 for error or omission |
| 7. Copying data | 10 | 1 for error or omission<br>½ for item out of order<br>½ for abbreviation |
| 8. Arranging names in alphabetical order | 5 | 1 for each error in spelling or name out of order<br>½ for placing initials before name instead of after |
| 9. Matching proverbs | 15 | ½ for error or omission |
| 10. Arithmetical problems | 15 | ½ for error or omission |
| Total | 100 | |

The test in its present form consists of ten parts with weights in scoring and deductions for errors and omissions as tabulated above.

The misspelled words in part 3 and the arithmetical problems in part 10 are not more difficult than material in spelling and arithmetic studied in grammar school.

The test is scored for speed as well as for accuracy. In scoring for speed, 60 points are given for completing the work in the maximum time allowed; namely, 75 minutes. For completing the test in less than 75 minutes, addi-

The method is illustrated in the following scores:

| MINUTES | SPEED SCORES |
|---|---|
| 75 | 60 |
| 70 | 70 |
| 65 | 80 |
| 60 | 90 |
| 55 | 95 |
| 50 | 100 |
| 45 | 105 |

Failure to complete the tests lowers the speed score as well as the accuracy score. If the tests are not completed and if the maximum time, 75 minutes, is

used, 6 points for each test omitted are deducted from the speed score which would otherwise have been received.

If the tests are not completed and if less than the maximum time is used, the deduction for each test omitted is one-tenth of the speed score which would otherwise have been received.

### AVERAGE SCORES OF DIFFERENT EDUCATIONAL GROUPS

Of the 4,610 applicants to whom the mental tests were given in 1922, 1,006 reported the grammar grades as their most advanced schooling, 3,394 reported high school, and 210 reported college. Each group included those who had attended and those who had been graduated from the given type of school. The small number of those reporting college study as compared with the total number examined was due in part to the fact that applicants reporting graduation from certain well-known colleges and universities were not required, in all cases, to take the mental tests.

TABLE 1

*Average accuracy and speed scores* of applicants with specified extent of schooling*

| SCHOOLING | ACCURACY | SPEED |
|---|---|---|
| Grammar school..... | 58.7 | 66.2 |
| High school..... | 71.8 | 75.0 |
| College..... | 82.5 | 85.2 |

* Probable errors were computed for all arithmetic means and standard deviations shown in this paper, but have not been entered in the tables.

Average scores for accuracy and speed according to educational groups are reported in table 1.

It will be noted that the scores for the high school group were higher than those for the grammar school group, and that the scores for the college group were higher than the scores for the grammar school and high school groups.

Separate scores in arithmetic, spelling and handwriting were recorded. Average scores in those subjects, according to educational groups, as shown in table 2, followed the same order as the scores for accuracy and speed of those groups, with the exception of the scores in handwriting which were the same for all groups.

Of ten simple arithmetical problems the average achievement of persons with grammar school training was less than half of a perfect score; of those with high school training, less than two-thirds; and of those with college training, little more than three-fourths. In spelling, the per cent of achievement of the several groups was even less creditable. In handwriting, each of the three groups had an approximate average score of 50.

TABLE 2

*Average scores of applicants on specified tests*

| SCHOOLING | ARITHMETIC | | SPELLING | | HANDWRITING |
|---|---|---|---|---|---|
| | On scale of 15 | On scale of 100 | On scale of 10 | On scale of 100 | On scale of 100 |
| Grammar school.. | 6.9 | 46.0 | 3.7 | 36.6 | 50 |
| High school..... | 9.6 | 64.0 | 5.0 | 50.0 | 50 |
| College..... | 11.8 | 78.7 | 6.4 | 64.1 | 50 |

The low scores in arithmetic may be partly explained by the fact that the arithmetic test stood at the end of the examination and some of the very slow applicants did not have time to show their ability on that test; the low

scores in spelling, by the fact that the spelling test consisted of marking misspelled words in connected discourse, of which the subject matter was the welfare work of the Metropolitan Life Insurance Company for its employees. It is possible that the attention of some applicants was attracted by the subject matter to such an extent that they overlooked misspelled words which they would have spelled correctly in a conventional spelling test. The low scores in spelling may be due, also, to the method of marking the spelling test. On the scale of 10, one-half point was deducted for each misspelled word which was overlooked. Since 42 misspelled words appear on the page, it was possible for an applicant to underscore 22 of the misspelled words, or 52 per cent of the total errors, and receive a mark of zero for the test. The scores in spelling should be interpreted, therefore, as marks above that minimum accomplishment which for the purpose of marking the test is equivalent to zero.

The handwriting scores were the result of judging by the Ayres handwriting scale the letters of application required of all those seeking employment with the Company. Letters from some persons who were not subsequently tested were included, and hence the number of scores in handwriting is greater than the number in arithmetic and spelling.

### COMPARATIVE SCORES FOR MEN AND WOMEN

Tables 3, 4 and 5 show the average scores for speed and accuracy and the average scores on specified tests, according to educational groups, computed for men and women separately, with an average score for those who attended and an average score for those who were graduated from each type of school.

A greater per cent of the men had attended high school and college than of the women. For each educational group the men made a higher average accuracy score than the women, with a higher average speed score except in the grammar school group.

### EFFECT OF SUPPLEMENTARY BUSINESS SCHOOL TRAINING

Business school training was considered supplementary to study in grammar school, high school, or college, and separate scores were computed to show the achievement of applicants with that training. The scores of those applicants were included, however, in computing the average scores of all applicants according to the educational groups.

Tables 3, 4 and 5 indicate that the advantage of business school training was greater for applicants of the grammar school group than for those of the high school and college groups.

As shown in table 3 supplementary business school training increased the average scores for accuracy and speed of grammar school applicants but not of high school applicants. The average accuracy and speed scores of the high school applicants with business school training were lower than the average scores of all high school applicants, probably because of the fact that pupils who leave high school to attend business school are often those who find the regular academic course too difficult or exacting. That is, pupils

apparently of lower intelligence tend to shift more than those presumably of higher intelligence. This explanation is weakened, however, by the fact that women of the college group with business school training made slightly higher average scores than the women of the college group.

In the arithmetic test, business school training raised the average score of grammar school applicants, as shown in tables 4 and 5, but not the scores of the high school and college applicants, with the exception of women of the college group. In the spelling test, supplementary business school training raised the average scores of men of the grammar school group and of women of all groups. The scores for handwriting were less affected by the amount of schooling of the applicants than were the scores

TABLE 3

*Average accuracy and speed scores of applicants with specified extent of schooling*

| SCHOOLING | MEN | | | | WOMEN | | | |
|---|---|---|---|---|---|---|---|---|
| | Accuracy | | Speed | | Accuracy | | Speed | |
| | Number | Average score | Number | Average score | Number | Average score | Number | Average score |
| Total | 1,273 | 73.10 | 1,273 | 76.05 | 3,337 | 68.05 | 3,337 | 72.54 |
| Grammar school | 196 | 61.10 | 196 | 66.05 | 810 | 58.10 | 810 | 66.20 |
| Attended | 19 | 62.25 | 19 | 65.65 | 43 | 56.00 | 43 | 63.90 |
| Graduated | 177 | 60.95 | 177 | 66.10 | 767 | 58.25 | 767 | 66.30 |
| High school | 966 | 74.30 | 966 | 76.80 | 2,428 | 70.85 | 2,428 | 74.25 |
| Attended | 715 | 71.70 | 715 | 74.30 | 1,803 | 68.05 | 1,803 | 72.60 |
| Graduated | 251 | 81.60 | 251 | 83.90 | 625 | 79.00 | 625 | 78.95 |
| College | 111 | 84.15 | 111 | 87.35 | 99 | 80.70 | 99 | 82.70 |
| Attended | 108 | 84.12 | 108 | 87.31 | 92 | 81.42 | 92 | 82.93 |
| Graduated | 3 | * | 3 | * | 7 | * | 7 | * |
| Persons with business school training: | | | | | | | | |
| Total | 148 | 70.9 | 148 | 73.30 | 1,117 | 66.05 | 1,117 | 71.55 |
| Grammar school | 47 | 66.95 | 47 | 67.95 | 451 | 60.60 | 451 | 68.15 |
| Attended | 4 | * | 4 | * | 17 | 58.10 | 17 | 65.15 |
| Graduated | 43 | 66.92 | 43 | 67.74 | 434 | 60.70 | 434 | 68.25 |
| High school | 94 | 72.00 | 94 | 75.15 | 644 | 69.25 | 644 | 73.50 |
| Attended | 81 | 71.80 | 81 | 75.35 | 557 | 67.95 | 557 | 72.60 |
| Graduated | 13 | 73.25 | 13 | 74.05 | 87 | 77.45 | 87 | 79.45 |
| College | 7 | 81.80 | 7 | 83.95 | 22 | 84.75 | 22 | 82.95 |

* Not computed.

for arithmetic and spelling. Supplementary business school training did not consistently increase or decrease the scores for handwriting of applicants with that training as compared with the average scores of all applicants of the several educational groups. 69.45 for accuracy, and 73.51 for speed, hence the age of applicants had little effect upon the average scores according to educational groups, as shown in tables 6 and 7. Study of the scores in each educational group distributed according to age would be

TABLE 4

*Average scores of men applicants on specified tests classified by extent of schooling*

| SCHOOLING | ARITHMETIC | | SPELLING | | HANDWRITING | |
|---|---|---|---|---|---|---|
| | Number | Score (on scale of 15) | Number | Score (on scale of 10) | Number | Score (on scale of 100) |
| Total | 1,273 | 10.00 | 1,273 | 4.87 | 1,297 | 45.87 |
| Grammar school | 196 | 7.16 | 196 | 3.76 | 197 | 44.64 |
| Attended | 19 | 7.58 | 19 | 4.87 | 19 | 40.26 |
| Graduated | 177 | 7.12 | 177 | 3.65 | 178 | 45.11 |
| High school | 966 | 10.34 | 966 | 4.88 | 970 | 45.95 |
| Attended | 715 | 9.78 | 715 | 4.46 | 718 | 45.25 |
| Graduated | 251 | 11.94 | 251 | 6.08 | 252 | 47.94 |
| College | 111 | 12.04 | 111 | 6.72 | 130 | 47.15 |
| Attended | 108 | 12.06 | 108 | 6.74 | 117 | 46.97 |
| Graduated | 3 | 11.50 | 3 | 6.25 | 13 | 48.85 |
| With supplementary business school training: | | | | | | |
| Total | 148 | 9.57 | 148 | 4.56 | 148 | 46.01 |
| Grammar school | 47 | 8.84 | 47 | 4.37 | 48 | 46.67 |
| Attended | 4 | * | 4 | * | 4 | * |
| Graduated | 43 | * | 43 | * | 44 | * |
| High school | 94 | 9.89 | 94 | 4.58 | 95 | 46.58 |
| Attended | 81 | 9.80 | 81 | 4.67 | 82 | 45.24 |
| Graduated | 13 | 10.50 | 13 | 4.02 | 13 | 55.00 |
| College | 7 | 10.25 | 7 | 5.75 | 7 | 31.67 |

* Not computed.

## AVERAGE SCORES ACCORDING TO AGE

The average score for accuracy and the average score for speed at specified age divisions varied but little from the average scores for all ages, namely, valuable from many points of view, but not from that of the Company in choosing desirable employees. It will be noted that more than one-half of the applicants examined were under 18 years of age, and 96.2 per cent were

between 16 and 24 years of age, inclusive.

### COMPARATIVE SCORES FOR MEN AND WOMEN

For both accuracy and speed the average scores for men at a given age were higher than the scores for women at that or any other age, except in the case of accuracy scores of boys under 16 years of age. In general, the scores of men showed a tendency to increase with age; the scores of women a tendency to decrease with age. This was probably influenced by the fact that a larger per cent of the men than of the women were found in the high school and college groups.

### SCORES OF PAROCHIAL SCHOOL APPLICANTS

Table 8 gives a comparison of the average scores for accuracy and speed of applicants with parochial school training only, (15.2 per cent of the total) with the average scores of a random sample of applicants with public school training only, (70.6 per cent of the total). The comparison is based upon rather small numbers, as shown in table 8, and therefore too great reliance should not be placed upon

TABLE 5

*Average scores of women applicants on specified tests classified by extent of schooling*

| SCHOOLING | ARITHMETIC | | SPELLING | | HANDWRITING | |
|---|---|---|---|---|---|---|
| | Number | Score (on scale of 15) | Number | Score (on scale of 10) | Number | Score (on scale of 100) |
| Total | 3,337 | 8.73 | 3,337 | 4.74 | 3,354 | 50.92 |
| Grammar school | 810 | 6.84 | 810 | 3.63 | 811 | 50.73 |
| Attended | 43 | 5.90 | 43 | 3.06 | 43 | 50.35 |
| Graduated | 767 | 6.89 | 767 | 3.66 | 768 | 50.76 |
| High school | 2,428 | 9.24 | 2,428 | 5.05 | 2,431 | 50.84 |
| Attended | 1,803 | 8.65 | 1,803 | 4.70 | 1,804 | 50.39 |
| Graduated | 625 | 10.94 | 625 | 6.06 | 627 | 52.13 |
| College | 99 | 11.58 | 99 | 6.07 | 112 | 54.11 |
| Attended | 92 | 11.72 | 92 | 6.17 | 96 | 54.79 |
| Graduated | 7 | 9.64 | 7 | 4.82 | 16 | 50.00 |
| With supplementary business school training: | | | | | | |
| Total | 1,117 | 8.36 | 1,117 | 4.79 | 1,117 | 49.98 |
| Grammar school | 451 | 7.58 | 451 | 4.06 | 451 | 49.86 |
| Attended | 17 | 6.62 | 17 | 3.13 | 17 | 53.75 |
| Graduated | 434 | 7.62 | 434 | 4.10 | 434 | 49.71 |
| High school | 644 | 8.76 | 644 | 5.23 | 644 | 49.90 |
| Attended | 557 | 8.38 | 557 | 5.11 | 557 | 48.99 |
| Graduated | 87 | 11.17 | 87 | 6.02 | 87 | 55.69 |
| College | 22 | 12.61 | 22 | 6.69 | 22 | 55.00 |

the results shown. For seven of the eight groups the scores of the parochial school applicants for speed were lower than the scores of the public school applicants.

Scores of parochial school applicants for accuracy and speed, as found in table 8 compared with the average scores for all applicants as found in tables 6 and 7, show that the parochial school applicants made a lower average accuracy score for six of the eight

TABLE 6

*Average scale at specified age divisions for accuracy by sex*

| AGE | TOTAL | | MEN | | WOMEN | |
|---|---|---|---|---|---|---|
| | Number | Average scale | Number | Average scale | Number | Average scale |
| All ages | 4,610 | 69.45 | 1,273 | 73.12 | 3,337 | 68.05 |
| Under 16 | 66 | 70.22 | 19 | 69.87 | 47 | 70.37 |
| 16 | 718 | 68.88 | 194 | 72.06 | 524 | 67.71 |
| 17 | 1,732 | 69.14 | 499 | 71.94 | 1,233 | 68.01 |
| 18 | 949 | 70.92 | 264 | 75.11 | 685 | 69.31 |
| 19 | 467 | 70.52 | 133 | 75.69 | 334 | 68.46 |
| 20 to 24 | 570 | 68.10 | 142 | 73.07 | 428 | 66.46 |
| 25 to 29 | 78 | 67.95 | 17 | 74.56 | 61 | 66.11 |
| 30 to 34 | 21 | 68.22 | 2 | * | 19 | 67.24 |
| 35 to 39 | 3 | * | — | — | 3 | * |
| 40 to 44 | 5 | * | 3 | * | 2 | * |
| 45 and over | 1 | * | — | — | 1 | * |

* Not computed.

TABLE 7

*Average scale at specified age divisions for speed by sex*

| AGE | TOTAL | | MEN | | WOMEN | |
|---|---|---|---|---|---|---|
| | Number | Average Scale | Number | Average Scale | Number | Average Scale |
| All ages | 4,610 | 73.51 | 1,273 | 76.06 | 3,337 | 72.54 |
| Under 16 | 66 | 74.70 | 19 | 75.65 | 47 | 74.31 |
| 16 | 718 | 73.74 | 194 | 75.95 | 524 | 72.92 |
| 17 | 1,732 | 74.20 | 499 | 76.25 | 1,233 | 73.37 |
| 18 | 949 | 73.85 | 264 | 76.45 | 685 | 72.85 |
| 19 | 467 | 73.11 | 133 | 75.45 | 334 | 72.19 |
| 20 to 24 | 570 | 71.48 | 142 | 75.55 | 428 | 70.13 |
| 25 to 29 | 78 | 70.77 | 17 | 79.55 | 61 | 68.32 |
| 30 to 34 | 21 | 68.22 | 2 | * | 19 | 68.29 |
| 35 to 39 | 3 | * | — | — | 3 | * |
| 40 to 44 | 5 | * | 3 | * | 2 | * |
| 45 and over | 1 | * | — | — | 1 | * |

* Not computed.

groups and a lower speed score in all groups.

Comparison of the scores of parochial school applicants in specified tests, table 8, with those of all applicants, according to educational groups, tables 4 and 5, shows that in general the average scores of the parochial school applicants were lower than the average scores of all applicants in arithmetic and spelling, but were higher in handwriting.

TABLE 8

*Comparison of parochial school applicants with random sample of public school applicants by sex*

| SCHOOL ATTENDED | APPLICANTS WITH PAROCHIAL SCHOOL TRAINING | | | | | | | RANDOM SAMPLE OF EQUAL NUMBER OF APPLICANTS WITH PUBLIC SCHOOL TRAINING | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Average age | Accuracy | Speed | Arithmetic | Spelling | Handwriting | Average age | Accuracy | Speed |
| Men: | | | | | | | | | | |
| Grammar school | 60 | 17.80 | 61.59 | 65.42 | 6.68 | 3.75 | 43.00 | 18.67 | 60.09 | 67.09 |
| High School | | | | | | | | | | |
| Attended | 102 | 17.92 | 71.46 | 71.96 | 9.74 | 3.97 | 46.18 | 18.24 | 72.60 | 73.99 |
| Graduated | 27 | 18.54 | 81.76 | 83.24 | 12.06 | 6.09 | 50.56 | 18.61 | 78.61 | 84.72 |
| College | 10 | 19.80 | 81.88 | 81.25 | 11.63 | 7.38 | 55.00 | 20.50 | 86.25 | 88.75 |
| Women: | | | | | | | | | | |
| Grammar school | 271 | 18.16 | 56.67 | 64.55 | 6.44 | 3.29 | 51.82 | 18.73 | 58.72 | 67.63 |
| High school | | | | | | | | | | |
| Attended | 195 | 18.04 | 64.50 | 70.94 | 8.26 | 3.95 | 51.00 | 18.42 | 68.58 | 72.76 |
| Graduated | 40 | 20.48 | 75.88 | 77.25 | 10.91 | 5.75 | 52.00 | 18.68 | 79.63 | 87.00 |
| College | 7 | 19.64 | 80.36 | 81.07 | 10.29 | 5.57 | 57.86 | 21.07 | 79.65 | 78.93 |

Average age of parochial school men, 18.1; women, 18.3 years.

## COMPARATIVE VALUE OF THE PARTS OF THE TEST

In order to judge the comparative value of the several parts of the tests, the scores for each part for 1922 were studied. Inspection of the scores showed that part 5, digit-letter substitution, was of less value than the other tests, since the distribution of the scores showed very little dispersion. Most of the scores were grouped at the mode or near it. The same was true to a lesser degree of the scores for part 2, marking unlike numbers and unlike names. On part 8, arranging names in alphabetical order, the applicants usually either failed entirely or made perfect scores. This may have been due in part to the nature of the test which was such as to show the effect of specific training. The result

was probably largely due, however, to the method of marking the test. One point was deducted from the score for failure to place a name in its proper alphabetical position. A second point was deducted when the name appeared elsewhere in the column. Since the test was marked on the scale of five, it is evident that under such a system of double penalties many applicants would receive zero.

TABLE 9

*Coefficients of variation* of average scores for accuracy and speed*

| SCHOOLING | ACCURACY | | SPEED | |
|---|---|---|---|---|
| | Men | Women | Men | Women |
| Total | 4.19 | 4.67 | 4.40 | 4.38 |
| Grammar school | 5.78 | 5.47 | 4.47 | 4.38 |
| High school | 3.70 | 4.09 | 4.19 | 4.23 |
| College | 2.32 | 2.99 | 3.66 | 4.01 |
| With supplementary business school training: | | | | |
| Total | 4.29 | 4.60 | 4.56 | 4.35 |
| Grammar school | 5.24 | 4.92 | 4.58 | 4.23 |
| High school | 3.76 | 4.07 | 4.44 | 4.30 |
| College | 2.73 | 2.03 | 2.97 | 3.59 |

* Per cent standard deviation of mean.

TABLE 10

*Coefficients of variation* of average scores in arithmetic, spelling and handwriting*

| SCHOOLING | ARITHMETIC (ON SCALE OF 15) | | SPELLING (ON SCALE OF 10) | | HANDWRITING (ON SCALE OF 100) | |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| Total | 38.40 | 45.70 | 54.21 | 53.59 | 27.67 | 24.33 |
| Grammar school | 59.92 | 57.60 | 73.40 | 69.97 | 28.05 | 23.81 |
| High school | 34.04 | 41.13 | 52.87 | 47.92 | 27.46 | 24.47 |
| College | 25.50 | 29.62 | 25.30 | 41.02 | 28.08 | 23.90 |
| With supplementary business school training: | | | | | | |
| Total | 40.96 | 46.41 | 58.33 | 51.36 | 31.23 | 24.65 |
| Grammar school | 46.15 | 50.13 | 62.47 | 60.10 | 25.99 | 23.47 |
| High school | 37.92 | 43.49 | 58.52 | 44.55 | 32.72 | 25.29 |
| College | 42.63 | 21.09 | 16.70 | 36.62 | 23.56 | 26.85 |

* Per cent standard deviation of mean.

The coefficients of variation[1] of the

[1] Per cent standard deviation of average score.

scores for arithmetic, spelling, and handwriting are shown in table 10. It is seen that the dispersion of the spelling scores was greatest and of the hand writing scores was least. In arithmetic and spelling the dispersion of the scores decreased with the advance of the grade of education attained. This relationship is observed also in the coefficients of variation for average scores for accuracy and speed, as found in table 9.

### COMPARISON OF ACCURACY SCORES OF GRAMMAR SCHOOL AND HIGH SCHOOL WOMEN

A skew frequency curve, as shown in figure 1, was fitted[2] to the accuracy scores of women with grammar school training, for which the average score

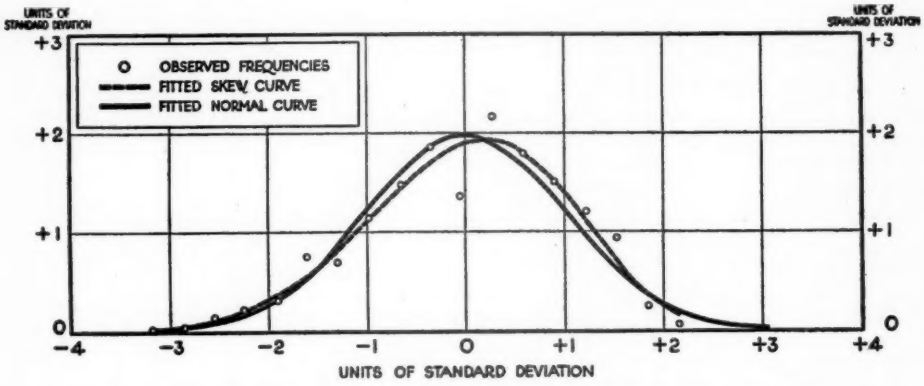


FIG. 1. ACCURACY SCORES OF WOMEN WITH GRAMMAR SCHOOL TRAINING

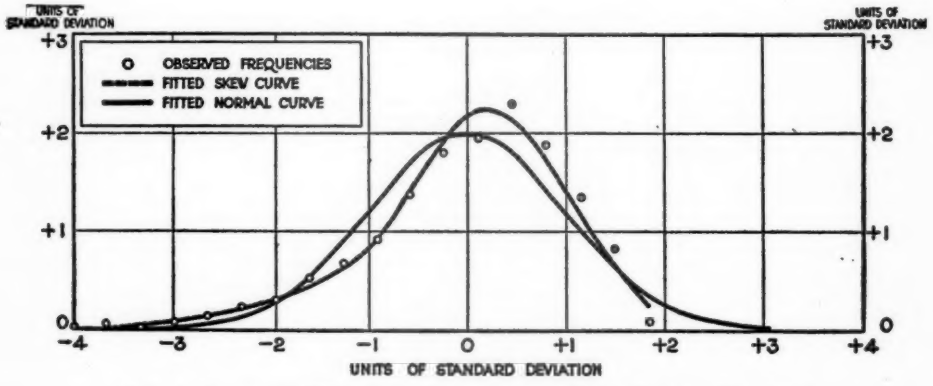


FIG. 2. ACCURACY SCORES OF WOMEN WITH HIGH SCHOOL TRAINING

[2] *See* Charlier, C. V. L. *Vorlesungen über die Mathematischen Statistik*, Verlag Scientia, Lund, Sweden, 1920. (Stechert, New York). P. 67.

is shown in table 3. The skewness of the curve was +0.171 and the excess was −0.045, indicating that the number of applicants who made scores above the average, was slightly larger than the number who made scores below the average, but that the peak of the distribution was a trifle lower than the peak of the corresponding normal frequency curve. Since the skewness and excess were small, the distribution was approximately that of the normal frequency curve. The scores were then distributed according to the normal frequency curve having the same mean, namely, 58.1, which for comparison also is shown in the diagram.

The procedure mentioned above was followed with the accuracy scores of women with high school training, for which the average score is shown in table 3. The results are shown in figure 2. As might be expected, the skewness, namely, +0.348, was greater than the skewness of the curve for grammar school applicants, and the excess was positive, namely, +0.096. This shows that the number of applicants who made scores higher than the average for the test exceeded the number who made scores lower than the average, and that in this case the contrast was greater than that observed in the corresponding scores of grammar school applicants. That is, the distribution of the scores of grammar school applicants differed less from the normal frequency distribution than the scores of high school applicants differed.

It has sometimes been urged that an ideal system of testing and grading should, with a sufficiently large number of persons examined, exhibit a frequency distribution according to the normal error curve. If this point of view is adopted, the fact that the skewness and excess of the curve for the scores of the grammar school group were smaller than those of the curve for the scores of the high school group may be taken to indicate that the testing and grading were applied somewhat more successfully to the cases with grammar school training than to those with high school training. But it must be remarked that the grammar school group was hardly a sufficiently large sample to warrant attaching very great significance to the comparatively small skewness and excess in this case.

The fact that the mean of the scores of women with grammar school training fell at 58.1, whereas that of the scores of women with high school training fell at 70.85, is, of course, the expression of the simple fact that the latter scores represent a somewhat higher grade of mental attainment than the former.

The somewhat notable "excess," as the term is understood with relation to frequency curves, in the high school scores may be construed as meaning that there is a tendency for the questions of the test to group the scores somewhere near the mean, that is to say, to throw into the central group individuals from groups which, with an ideal system of testing, would be some above and some below that mean.

## SUMMARY

The results of this investigation of the relation of test performance and schooling may be summarized as follows:

1. Applicants with high school train-

ing made higher average scores for speed and accuracy than applicants with grammar school training only. Applicants with college training made higher scores than grammar school and high school applicants.

2. For each educational group the men made a higher average accuracy score than the women, and a higher average speed score except in the grammar school group.

3. Advantage of supplementary business school training was greater for applicants of the grammar school group than for those of the high school and college groups.

4. Within the small age range of the applicants, age had little effect upon the scores made.

5. For both accuracy and speed, according to age divisions, the lowest average score for men was greater than the highest average score for women, with the exception of the average accuracy score for boys under 16 years of age.

6. Average scores for accuracy by educational groups of applicants with parochial school training only were lower than average scores of a random sample of applicants with public school training only, in five of eight groups. In average scores for speed the parochial school applicants were lower in seven out of eight groups. As compared with average scores of all applicants the parochial school applicants made a lower average accuracy score in six of eight groups, and a lower average speed score in all groups.

7. In general, average scores of parochial school applicants by educational groups were lower than average scores of all applicants in arithmetic and spelling, but higher in handwriting.

8. Scores on tests of digit-letter substitution and of marking unlike numbers and unlike names gave little aid in judging among applicants, because of the grouping of scores at the mode; and scores in arranging names in alphabetical order were dependent upon training and upon the method of scoring, as indicated by the fact that applicants usually made perfect scores or failed.

*(Manuscript received April 15, 1925.)*

# Industrial Psychology in Germany

By Otto Lipmann

*This brief survey of the work of seventeen of the chief investigators of industrial psychology in Germany was prepared by Dr. Otto Lipmann of the Institut für Angewandte Psychologie in Berlin, and translated by Dr. Morris S. Viteles.*

A PICTURE of the present status of industrial science in Germany must be constructed in the form of a mosaic out of the most important individual investigations which are now being carried on. The work is distributed over many places, and centralization and a uniformity of program are altogether lacking. No claim for completeness can be made for this report. In order to avoid suggesting that this report represents a critical evaluation, it has been decided to follow an alphabetical order.

*Atzler* (Kaiser Wilhelm Institute for the Physiology of Work in Berlin) is investigating, by the measurement of changes in carbonic acid content, the relative difficulty of different kinds of work, the fatigue produced by various types of work, and the time a man can continue at work without undue fatigue.

*Blumenfeld* (The Psychological Institute of the Technical High School of Dresden) has tried out a number of the methods which are being used in the measurement of vocational fitness in order to determine which of these is the most useful. He has also developed a number of valuable new tests. In addition, Blumenfeld has done some work in the psychology of window display advertising.

*Bogen* (The Vocational Testing Office of the Berlin Bureau of Occupations) has undertaken investigations on the value of school observation in psychological vocational guidance. In his opinion, the most practical organization of vocational guidance, and the formulation of projects in vocational selection are of that sort in which vocational guidance is based upon a picture of total personality pattern, in non-mosaic form, as well as upon a complete job analysis of the vocation itself. Under his direction new methods of testing for a series of occupations have been worked out and tried out in a practical manner.

*Friedrich* (Technical High School of Karlsruhe) is occupied at the present time with the organization of training procedure on a psychological basis.

*Giese* (Psychological Institute of the Technical High School of Stuttgart) has been busy building up a foundation of theory for industrial psychology, and with the compilation of the widely dispersed methods for testing vocational aptitude. Giese also hesitates to construct the complete picture of vocational aptitudes from its individual elements in the form of a mosaic. He further believes that the psychoanalytical methods can be used in obtaining a complete picture of the total personality of the subject. His interests cover the improvement of working methods, the organization of vocational testing and the further systematization of training procedure.

*Hellpach* (The Institute of Applied Psychology at the University of Heidelberg) has just published a series of monographs in which are described a number of investigations having for their object the establishment of closer relations between the worker and his work so that the worker may achieve greater satisfaction in his work.

*Klemm* (The Section of Applied Psychol-

ogy of the Psychological Institute of the University of Leipzig) is investigating the consumption of energy on the part of the worker when the same machines are constructed in different ways, in order to find the best method of constructing these machines. He is developing tests of vocational capacity for the Bureau of Occupations of Leipzig.

*Kraepelin* (The Institute of Psychiatric Investigation in Munich) is investigating, with the aid of his colleagues and by means of laboratory experiments, the most practical distribution of work and length of work pauses for simple mental work and for skilled work. In addition, he is following out leads on the relation of strikes and work orders to different systems of wage payment. At the same time, the effect of malnutrition and of various exciting drugs such as alcohol, tea, etc., are being investigated.

*Lipmann* (Institute of Applied Psychology in Berlin) is devoting himself to laying down a foundation of theory and to the development of an epistemology of the science of work, as well as to a general consideration of fundamental problems of method. Characteristic of his Institute are summaries in which the literature covering the entire field of science in relation to work is systematically reviewed.

*Marbe* (Psychological Institute of the University of Würzberg) has interested himself particularly in accident hazards. In addition, inclusive works on the psychology of advertising have come from his Institute.

*Moede* (Laboratory of Industrial Psychology of the Technical High School of Charlottenburg and the Institute of Economic Psychology of the Commercial High School of Berlin) concerns himself primarily with the systematization of machines and methods of work on a psychological basis. In addition, he is working on the scientific evaluation of advertising posters and of accident prevention posters. He is still working with tests for the selection of apprentices for various industrial establishments.

*Peters* (Psychological Institute of the University of Jena) and his assistant Argelanger have been working on the effect of practice and, with this as a starting point, have developed a critical analysis of individual investigations on the measurement of vocational aptitudes. They have also investigated the most suitable form of report for school observations.

*Poppelreuter* (Institute of Clinical Psychology and Vocational Guidance of Bonne) has chosen as his special field of research the development of methods useful in general diagnosis. He is also interested in the construction of trade tests. He has worked on the analysis and interpretation of work curves in the shop.

*Rupp* (Section of Applied Psychology of the Psychological Institute of the University of Berlin) has been busy with the theoretical analysis of tests used in vocational selection and in their systematization and standardization. He has shown a particular interest in the problems and technique of evaluation.

*Sachsenberg* (Chair in Science in Relation to Work in the Technical High School of Dresden) has concerned himself with the problem of how the natural rhythm of the worker develops, and how the number of work pauses voluntarily introduced by workers can be decreased.

*Schlesinger* (Dept. of Scientific Investigation of Machine Tools in the Technical High School of Charlottenburg) has undertaken to re-organize plant management from the point of view of the psychological and psycho-physiological factors involved. In this connection stress has been laid on the development of the best methods of work. As a result of his work rules have been developed for the most suitable form for tools.

*W. Stern* (Psychological Laboratory of the University of Hamburg) has developed a series of new tests of vocational aptitudes; e.g., for auto drivers. From his laboratory have also appeared further investigations on the problem of monotony.

The results of these investigations have been published in the following Journals and Monograph series:

1. Arbeitswissenschaftliche Monographien (In: Veröffentlichungen aus dem

Gebiete der Medizinalverwaltung), edited by Lipmann.
2. Deutsche Psychologie, edited by Giese.
3. Industrielle Psychotechnik, edited by Moede.
4. Jenaer Beiträge zur Jugend- und Erziehungs-Psychologie, edited by Argelander, Peters and Scheibner.
5. Jugend und Beruf, edited by Liebenberg.
6. Psychologische Arbeiten, edited by Kraepelin.
7. Psychotechnische Zeitschrift, edited by Rupp.
8. Schriften zur Psychologie der Berufseignung und des Wirtschaftslebens, edited by Lipmann and Stern.
9. Sozialpsychologische Forschungen, edited by Hellpach.
10. Zeitschrift für angewandte Psychologie, edited by W. Stern and Lipmann.

(*Manuscript received April 7, 1926.*)

# The Interview: A Bibliography

By Francis F. Bradshaw, *University of North Carolina*

*In submitting this bibliography for publication Dean Bradshaw said, "It is neither comprehensive nor selective, but merely a beginning, a nucleus for other people to add to and verify and correct." It was prepared with the assistance of Mr. G. B. Logan, Reference Librarian, University of North Carolina, and is based primarily upon the reading done by the Committee on the Interview in Professor Ben D. Wood's class in Educational Personnel Administration at Columbia University during the summer of 1925.* (*See News Notes.*)
*So far as the editor knows there is no other published bibliography on the interview.*

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(*Manuscript received December 21, 1925.*)

# Book Reviews

## LABOR ECONOMICS

*By Solomon Blum. New York: Henry Holt & Company, 1925. Pp. ix + 579*

REVIEWED BY H. G. KENAGY

Developing his study of labor economics from the middle of the eighteenth century, and tracing the various concepts of our present labor theories through their legal, social and even literary evolution, Professor Blum has given us a comprehensive though fragmentary analysis and appraisal of the processes of standardization and valuation set up by the labor movement. He sees the whole of the movement as a part of "the purposeful activity of society in modifying enterprise" and "protecting itself from the blind forces of the market." Labor legislation, trade union development, socialistic and communistic movements, have at least one common element: "they standardize. They represent a group purpose which is not mechanistic. Their acts are processes of social valuation, not of simple pricing. In short, these tendencies are sophisticated. It is because the labor movement in its many manifestations represents the most dominating expression of the principle of standardization, and because the collectivist movements are its supreme manifestations, that a particularly important field of investigation is opened up by Labor economics" (p. vii ff).

Beginning with an analysis of the economic philosophy and legal theory of the English people from 1776 to 1850, the author follows with five chapters on the legal aspects of the movement, considering such subjects as "The Meaning of Freedom," and "The Right to Strike." Chapters VII to XII inclusive, deal with social phases of the movement—unemployment, social insurance, principles and methods of industrial peace. In the four chapters following, trade unionism, "the most conspicuous and effective element of the labor movement," is discussed as to forms, tactics, and monopolistic tendencies. "Forms of Unionism" takes account of the shop union, or employee representation, points out its short-comings as well as its advantages over the craft union, and calls for the two forms to unite for mutual good. "Unionism and Conflict of Interests" discusses the notion now widely preached that there is no real conflict of interests between employers and employees. Each of the schemes or devices employed to support this contention is examined—welfare work, profit sharing, selling stock to employees, scientific management, and personnel administration.

"Theories of Wages" points out the inadequacies of the theories of the older economists as well as the latest cost-of-living faddists, and suggests the need for a broad study of the methods of increasing the efficiency of productive processes, reaching wider markets, and at the same time, developing and stimulating the forces which are persistently and steadfastly working for international organization and peace. That is, the author advocates a broader study of socio-political economy.

The concluding chapters dealing with "The Wider Program of the Labor Movement," examine the aims and purposes of the various collectivist programs. In view of the present system of production, with

its outstanding characteristic of almost complete mechanization, Professor Blum scouts the value of any attempt by personnel administrators to introduce educational content into industry to supply the human needs of workers or bring back joy in work—to effect a reconciliation of machine industry with the handicraft spirit (pp. 468 ff). He concludes that it is well for the labor movement "to concentrate its attention upon increasing pay and reducing hours, while at the same time improving the efficiency of the industrial enterprise, rather than to follow a false leadership in the attempt to bring an interest content into a process which is essentially automatic" (p. 473).

Professor Blum claims to have no point of view. He refuses to join any sectarian camp. He insists there is no "Labor Problem," no "Solution to the Labor Problem." Analysis and appraisal of the processes of standardization and valuations set up by the labor movement are needed," but those processes are not worked out or finished, therefore certitude would be an impertinence." This attitude, with the corresponding absence of dogma, is most refreshing and welcome. Yet the reader is led, by the relative attention and space given to certain subjects, to suspect that the author has some private opinions. Discussion of labor legislation and unionism occupies two-thirds of the volume. While the historical importance of these factors might justify so much attention, the present vogue of employee representation in management, personnel administration, labor capitalism, and similar matters would seem to justify more extended treatment of these subjects. Personnel administrators are attempting to do considerably more than put the creative impulse back into industry—(and welfare work is not part of the program!). They hope to assist in the process of "increasing the efficiency of the industrial enterprise," which is an essential part of the author's hope for the labor movement, and the contribution which they can make should have received more attention.

Professor Blum's attempt to analyze and appraise, rather than to propose a plan or theory, makes his volume of unusual interest and value to all students of the labor movement. A lengthy bibliography, by chapter headings, and an excellent index, should make it exceptionally useful as a text-book.

## INCREASING PERSONAL EFFICIENCY

*By Donald A. Laird. New York: Harper & Brothers, 1925. Pp. x + 209*

Reviewed by Harold E. Burtt

The reviewer lays down the book with mixed feelings. His first inclination is to criticize Laird for going out on thin ice, but his second impulse is to commend him for not falling through. Laird aims to offset the writings of pseudo-psychologists on this general topic of personal efficiency by presenting scientific facts in an equally attractive form. To this end he meets them on their own ground with reference to style, catchy chapter headings, self-administering tests and the use of the second person. The treatment throughout is lively. For instance "Which way are you headed? Are you letting your plans look out for themselves? Remember the mastodon? Remember the dinosaur?" or "Are you laying your mental bricks with eighteen movements or with five?" The reader is frequently addressed personally in the way that appeals to the type of individual that consumes literature on health, happiness, and prosperity. It seems that the book should effectively fulfil the aim mentioned above. However, Laird keeps his feet on the ground and

commits, as far as can be observed, no scientific fallacies.

It is impossible in a brief review to give any comprehensive notion of the wide scope of material covered. There is a discussion of environmental factors such as illumination, with tables showing the desirable number of foot-candles for various conditions. The consideration of practice brings out the importance of distribution, eliminating useless items and learning by doing. The chapter on habit gives the conventional things regarding economy and the usual rules for breaking habits. Suggestions are made as to acquiring an ability for more rapid reading by skipping the unimportant and suppressing vocalization. Various devices for improving methods of memorization are cited.

The discussion of "pitfalls of thought" goes into Bacon's "Idols of the tribe, the market place, the den, and the theatre." "Putting the emotions to work" brings out a few fundamental principles such as having physical outlets for undesirable emotions, avoidance of eating during emotional stress and recommends what is tantamount to personal psycho-analysis in rummaging the early memories for instances of suppression. There is a discussion of the different types of personality and the possibility of auto-suggestion. "The battle with fatigue" emphasizes its mental aspect and "Repairs Free" brings out the importance of sleep and relaxation.

The book is very readable and the illustrations are usually vivid; for instance, we can remember the shape of Italy better than that of Germany because of the former association with a boot, or, we remember the fat woman in the circus because she caught our attention more strongly. The book also abounds in statements which border on the epigram; such as, "using skill thus comes to be synonymous with using the skull;" "imagination is memory gone wild;" "all men are possessed of adrenals and at times they are possessed by them." There are many suggestions that are distinctly valuable. The business man is advised to do his mental work in the morning and his routine work in the afternoon. Faking an interest is suggested as a desirable substitute for genuine enthusiasm. Changing habits rather than breaking them is advised. Biting the lips or holding the tongue will prevent vocalizing during reading.

The book possesses many other interesting features. At the end of each chapter are personal pointers which constitute practically a review of the chapter. There are also various tests which the reader may use on himself,—silent reading, or information, or mental hygiene tests with stencils for correcting them. If those who are inclined to read literature on personal efficiency could substitute this book for the less scientific ones along these lines it would be very much worth while. The work is likewise more comprehensive than other books put out by reputable psychologists in this field. It is not to be recommended as a typical academic work on applied psychology, but it has a legitimate place to fill. It is sound scientifically, its style is readable, its epigrams and cartoons will hold the popular interest. The reviewer enjoyed reading it.

## HANDBUCH PSYCHOTECHNISCHER EIGNUNGSPRÜFUNGEN

*By Fritz Giese. Halle a. S.: Carl Marhold Verlagsbuchhandlung, 1925. Pp. 870*

Reviewed by Max Freyd

In this Handbook of Vocational Tests of almost 900 large and well-illustrated pages, the author presents a mine of psychological tests for use in vocational selection. The research worker in this field will find here one of the most complete

accounts of tests available in any language. Almost every phase of human activity is represented. In many cases the tests are printed in full or represented by illustrations.

The first part of the book covers the simpler processes. Tests are described for such processes as speech, reading, writing, arithmetic, memory span, memory, association, apperception, imagination, comprehension, judgment, organization, suggestibility, sensory acuity and discrimination, manual dexterity, will, attention, emotion, originality, spontaneity, ethics and humor. This is followed by a discussion of test series, group tests, and tests of special vocational abilities. The latter are classified under commerce, industry, traffic, and public safety.

The second part of the book deals with more complex inner processes, and covers such topics as symptoms of bodily disturbances, psychoanalysis, and the analysis of personality.

The third part is devoted to the practical problems of industrial testing, and treats of the factors which disturb the accuracy of the test results, the problem of validation of tests, and the organization of a psychotechnical laboratory.

Analysis of Dr. Manson's Bibliography on Psychological Tests which appeared in the Journal of Personnel Research for November-December, 1925, brings out the startling fact that 90 per cent of her references are dated 1919 or later. Although her bibliography is not exhaustive, it averages over 62 citations a year for the last seven years.

There can be no doubt that the compiler of a handbook for a technique so young and with such a rapid growth undertakes a task that is much more appropriate to a loose leaf notebook than a bound volume. It is preferable to wait until opinion on classification and technique has crystallized before issuing an authoritative handbook. Dr. Giese has proceeded in the face of difficulties, and while he deserves great credit for having compiled a valuable work, he must expect to find investigators who disagree with his presentation.

The theoretical discussions of tests are full of interest, but the value of the volume for the research worker would be increased if more space were given to statistics based on the use of the tests. The volume is not entirely bare of figures but in most instances the test seems to be recommended on the faith of the clinical psychologist. In this respect the volume suffers by contrast with such scholarly works as Whipple's Manual of Mental and Physical Tests or Stern and Wiegmann's Methodensammlung zur Intelligenzprüfung von Kindern und Jugendlichen.

While considerable space is given to the Army Intelligence Tests, the American intelligence scales, and Link's tests, the reader will find no discussion of such American developments as the Downey Will-Temperament test, the Kent-Rosanoff Association list, the Army Trade Tests, the Seashore Musical tests, the newer tests of character and personality, the Woodworth Personal Data questionnaire, and the use of personal history and interest analyses in vocational selection. Such names as Thurstone, Chapman, Tagg, Spielman, Burtt, Kitson, Kornhauser, Viteles, O'Rourke, Telford, Snow, Bills, Hollingworth, Poffenberger, Benge, Bingham, Yoakum, Paterson, and Miner do not appear in the index.

The theoretical viewpoint expressed in the book is often at variance with American beliefs. For instance, on page 22, the author makes the following statement:

"Experiment is never used here to mean a direct measurement or the possibility of a physical measurement. This fundamental error has been made by many people who practice psychology semiofficially, and cannot be too strongly rejected. Psychological and physical experiment, psychological and technical measurement, are not generally comparable. We cannot measure in the technical or scientific sense in psychotechnology. We can only control technically the conditions of the constellation in which the subject is placed; that is the meaning of measurement."

Most American investigators have proceeded on the theory that a test need only measure behavior directly, in the same

manner as a speedometer measures speed or a seismograph disturbances of the earth's crust.

The American investigator when attacking a problem in vocational selection will find Dr. Giese's volume an invaluable though incomplete check list for the selection of tests for trial.

## SOCIAL AND VOCATIONAL ORIENTATION FOR WOMEN

*By Iva L. Peters. Richmond, Va.: Southern Woman's Educational Alliance, 1926. Pp. 50*

REVIEWED BY C. S. YOAKUM

This is a manual resulting from a review of the work of the Alliance during the last ten years and from the experience of the author in her courses and vocational guidance work at Goucher College. The manual itself has been tested for only a year in its present form.

The manual contains an outline and short syllabi for each of nine topics in the "Course in Social and Vocational Orientation for College Women." The topics are: The Need of Orientation; The Education of Women; The Institutionalized Activities of Women; The Industrial Revolution; Effects of the Industrial Revolution on the Lives and Activities of Women; Vocational Guidance and the Social Order; A Month's Survey of the Curriculum; Economic Value of a College Education; The New Economic Position of Women.

A representative bibliography is given. In addition there are lists of subjects for discussion and two sample essays required of students in the appendix.

Dr. Peters has had the courage of her convictions in presenting this much needed sample to the college world. One might cavil at the list of topics, wonder why so much time is spent on the industrial revolution, question whether greater space might not be given to modes of entrance to existing occupations, etc. Yet the plan and purpose are wholly admirable. An instructor giving whole time to such work in the college might finally bring such pressure from demand, that the existing college curricula would be revolutionized.

We need not argue that all education is for the purpose of making a living, but we may agree with the author that education is for a purpose. The enumeration of those purposes will require college instructors to be more circumspect in stating why they are giving certain courses. To be sure education for making a living is a lowly objective. Nevertheless, if we can clearly define our aims at this level, we shall be better prepared through acquired skill and the development of method to attempt definition of other aims.

A generalization of this manual will be important to any instructors and supervisors in industry giving courses to women who have not been to college. Hundreds of thousands of women in business and industry will miss the orientation value of the contents of this manual because personnel men will say it is for college women, and they do not have any college women in their organization. In that case give the manual to one of your bright young women, or several to several of them. Tell them to prepare talks so that the others will understand. New topics of conversation will appear in your organization.

Dr. Peters has shown the way. It remains for personnel officers to adapt and develop the idea.

## CAN BUSINESS PREVENT UNEMPLOYMENT?

*By Sam. A. Lewisohn, Ernest G. Draper, John R. Commons, and Don D. Lescohier. New York: Alfred A. Knopf. 1925. Pp. iii + 226*

REVIEWED BY DAVID R. CRAIG

Can business prevent unemployment? The authors of this book are optimistic. Business can prevent much unemployment if it will only try.

The authors begin with a definition of their intended scope. "The mitigation of unemployment depends," they say, "not only upon the action of manufacturers and producers but also upon the action of financial and banking groups." They specifically confine themselves, however, to the possible solutions which may be reached by producers and industrialists, leaving to others the important task of settling the disputed relations of financiers to the business cycle.

The practical slant of the volume is immediately apparent. The authors' concern is for overcoming unemployment, and the chapter "How Some of Us Have Met Unemployment" discusses the remedies which an individual establishment can try in attacking its own peculiar swings of idleness. Here is an excellent review of the well-known devices of stretching the buying seasons over the whole year through advertising, salesmanship and price cutting in slack times; the introduction of supplementary lines; manufacturing for stock in off seasons; production planning; and the elimination of jobbers' speculative purchasing by selling over their heads directly to retailers. The chapter concludes with a suggestive questionnaire with which managers may quiz themselves about their own establishments, and an impressive list of companies which have been successful in the use of stabilizing policies.

The next two chapters discuss the facts and the costs of unemployment, and there follows a summary of public programs, domestic and foreign, which have been devised to relieve unemployment at critical periods. Unemployment insurance is reviewed, with its potential force for motivating employers to take stock of their own managerial plans. In a brief closing chapter the authors wisely conclude that the way to begin the stabilization of employment is to begin.

Altogether the book is a valuable summary of the unemployment situation and the remedies which have been proposed for overcoming it, written briefly and interestingly for the busy reader. Its chief defect grows out of this very attempt to make "a book that could be read by men in active life."

In some parts the authors have abbreviated too strenuously. For instance, they discuss the establishment of the Pennsylvania Emergency Public Works Fund in 1917, but do not state whether the fund was used to alleviate the severe unemployment situation of 1921–1922. They discuss the beginnings of an unemployment insurance plan at the Dennison Manufacturing Company, but do not show how well that fund has worked as an incentive to prevent layoffs other than noting Mr. Dennison's opinion some two years before their book was published. The reviewer is informed that all the out-of-work benefits under this plan have been paid out of the interest on a fund small enough to be wiped out by a two-weeks shutdown, and surely this fact would be of interest even to men in active life.

Possibly it is unfair to expect that a short review of young devices should contain an evaluation of their merits. Yet if the authors were trying to prove that the pudding was worth eating, they might have told how it tasted to those who have already nibbled at it.

A more serious error was the omission to state explicitly the importance of planned expansion, of rejecting orders when

they require additional capacity beyond the budgeted capacity. It has long been recognized that overexpansion in credit brings grief in its wake; and it has been demonstrated that the same rule may profitably be studied and used in individual establishments. The relation of idle capacity to production and stability cannot be left wholly to the financial and banking groups.

## PRINCIPLES OF PERSONAL SELLING

*By Harry R. Tosdal. Chicago: A. W. Shaw Co., 1925. Pp. xii + 753*

REVIEWED BY ADELBERT FORD

This work of 753 pages is designed to cover a description of practice and principles in all fields where goods are sold by means of the personal agency of the salesman. It advances systematic methods to be used in merchandising in wholesale, retail and consumer fields; covers problems of sales management and sales employment; and reviews prevalent practice in the training of men, giving descriptions from the active business world. The work is broad and comprehensive.

The statement that "Salesmanship is an art, not a science" is probably intended to convey to the reader some intimation of the present lack of prediction and precision in sales management and the consequent lack of stabilized principles which make for exactness in a real science. Whether selling is an art or not, we shall not venture to say; but we do have to agree with the author that at present salesmanship is not a science. One might wish, in reading the book, that the author had been somewhat more impressed with the possibility of making salesmanship a science, *some day*, and had therefore given greater space to the presentation of methods of precision in studying personnel statistics as they apply to selling. While statistical mathematics is a somewhat boring subject to the average modern business man, it would seem, upon examination of the somewhat fragmentary salesmanship research, that ultimately the business world will be forced to adopt methods of studying salesmanship (already used in some insurance companies), which are based on precise statements or coefficients of probability.

Although the book purposes to deal with salesmanship as a necessary function in economics, it is especially gratifying to a psychologist to see a treatment of character-analysis and personnel selection formulated in such a manner that it is in agreement with sound psychology. Professor Tosdal has shown, in this work, an entirely adequate acquaintance with the cognate sciences and as a result has produced a book which is free from some common errors formerly found in books written on salesmanship by men with one-sided training. His statements have been weighed, generally, by careful comparison with the works of reliable authorities, and his selection of results is agreeably cautious and conservative. It is refreshing to find more than the usual collection of inspirational statements.

The book will be valuable to men in business for the many descriptions of actual sales practice used by concerns with reputable positions. Whether or not present practice in the business world is the ultimate and best possible, we need not hesitate to accept this work for immediate use. The fact stands that present practice, the best and only guide we have, must be used as a foundation for future development.

# Abstracts

*A New Method of Indicating Fatigue.* WALTER N. POLAKOV. Management in Manufacturing, December, 1925, Vol. 10, No. 6, pp. 343–344.

Proposes that fatigue can be measured by measuring the $CO_2$ in exhaled breath. First, studies the relationship between work done and $CO_2$ exhalation in the case of two firemen stoking small boilers, and second, by means of similar testing for $CO_2$, the combined observations on a number of workers in various industries at different occupations was compared to the power consumption from a public utility plant, over a period of a week. Discusses the curves and concludes:

1. Maximum $CO_2$ in exhalation is an index of full load on the muscles.

2. Decrease of $CO_2$ content in spite of continued work indicates overload and is a signal of fatigue.

3. Age and size of the worker influence the $CO_2$ content. The younger and lighter men produce more work with the same $CO_2$ discharge than do the older and heavier men.

4. Peaks in the $CO_2$ more immediately follow exertions.

5. Training of workers considerably reduces $CO_2$ exhalation for the same release of productive work.

6. The efficiency (biological) of work decreases with the expenditure of energy per unit of work—increases as work continues (per day or week).

*Purpose as a Psychological Factor in Management.* ORDWAY TEAD. Bulletin of the Taylor Society, December, 1925, Vol. 10, No. 6, pp. 254–267.

Maintains that the purposes and motives which actuate managers in their work are as important to its success as their methods. Purpose and procedure must look in the same direction to become fruitful. Managers and workers must strive to change conditions and methods so that the individuals in each group can share in and work for the same purpose.

Emphasizes two points: (1) the character of the purposes of managers is vital to the effectiveness of their behavior, (2) the purposes of managers—and all other groups in industry—change only as all the surrounding conditions allow and require them to change. The following questions are asked to bring out these points:

1. What is a purpose; and what effect have purposes on conduct?

2. Where do the individual's purposes come from; and how do they come to be what they are?

3. How do group purposes differ from individual purposes?

4. What groups participate in the conduct of industry today; and what purposes are seen manifested in their behavior?

5. Are these group purposes in conflict; and if so,

6. What is the possibility of establishing and giving effect to purposes which can be shared in and worked for by the different groups participating in industry?

And if there is such a possibility,—

7. Do any principle and any method suggest themselves from this analysis which will help managers to bring to pass a greater agreement among groups or integration of group purposes in industry than exists today?

Each of these is discussed and in the last the answer is in the affirmative. The definite principle evoked is that "Where the purposes of groups are in conflict, the only way to secure a basis of genuine coöperative activity is to modify the purposes in the direction of others which are acceptable to the several groups; and this modification can come about only by the invention and use of methods and procedures which

allow the groups using them clearly to benefit from them and thus to change their purposes."

*The Extent and Application of Psychology and Psychological Method in English Industrial Life.* GEORGE H. MILES. Harvard Business Review, January, 1926, Vol. 4, No. 2, pp. 138–144.

Gives an account of the work being done in England by the National Institute of Industrial Psychology since 1921. Much research has been carried on for private concerns by this organization, and its full-time investigators are available for almost any problem, requiring months or years to complete. Studies have been made on rest pauses, relay work, time and motion study, accident causation, temperature in textile mills, ventilation, humidity, etc.

Less direct influences are also at work, consisting of conferences and lectures on industrial psychology, courses at the universities on the subject, radio talks arranged by the Institute, and various methods to arouse the interest and co-operation of management and workers.

Vocational selection is receiving much attention and a number of firms have sought the assistance of the Institute in introducing selection tests for workers. Tests for clerical workers, dressmakers' apprentices, pipers, packers, engineers, tapestry workers, etc., are now in use. Other problems concerning the working environment are being attacked by the psychologist, and while the work is slow an attempt is being made to benefit the whole community as well as the individual worker.

*Workers' Participation in Job Study.* GEOFFREY C. BROWN. American Federationist, November, 1925, Vol. 32, No.11, pp. 1029–1038.

Discusses the advantages to workers which will follow their participation in job analysis, and suggests some ways in which such participation may be assisted. From the standpoint of both workers and management there are four considerations that argue for job analysis: equity, safety, interest, and economy in performance of work. Criticism has been aimed at job analysis in that it has been conducted too undemocratically, is too much under the control of management, and has not provided for sufficient participation of the workers.

Summarizes an imaginary case in which a skilled worker loses all initiative and interest in his work as a result of job-study and subsequent instruction sheets from the planning office, and says that if management preëmpts exclusive control of job study and the results therefrom, the worker loses both opportunity and necessity for using his own wits, and under such conditions maximum efficiency cannot be obtained.

Participation of the workers may be accomplished by the establishment of a joint job analysis committee on which workers and management are represented along with a technical expert from the central planning office. This committee should be accessible to each worker so that he is free to give all the suggestions and help he wishes. To a very considerable degree each worker becomes the investigator of his own job.

Defends time-study from the union standpoint, claiming that it should be used by labor as an impartial instrument for revealing the truth about work—truth as to fair output, effort, conditions, a fair day's work, and fair compensation. Labor can use time-study to combat its use by unscrupulous employers who distort the result obtained from it.

*Structural Features of Shop Committee Plans.* JOHN W. RIEGEL. Harvard Business Review, October, 1925, Vol. 4, No. 1, pp. 17–31.

States the objectives and purposes of employee representation. Shows the wide divergence of importance of these objectives in the minds of the executives of about fifty concerns visited by the author. This difference in objectives is of vital importance in deciding upon the make-up and relationships of representative bodies.

Goes into detail on methods of grouping employees for representation, size and make-up of committees, ratio of representation,

relations and functions of the representative bodies, and employees' associations.

*A Step Toward Industrial Self-Government.* P. G. AGNEW. New Republic, March 17, 1926, Vol. 46, No. 589, pp. 92–95.

Compares the two primary sources of law, the statutory method, and common law, with some simple coöperative methods which are now rapidly coming forward for the solution of problems that are intrinsically industrial in nature. Although simple in theory the statutory process is now generally admitted to fail in the great majority of industrial cases. Framing of legislation is left to committees influenced by the lobby. Legislation on technical matters frequently hampers progress, as evidenced by the Pennsylvania law regarding blasting in coal mines.

Follows with description of some cases of coöperative solutions and shows how the growth of trade and technical associations has furnished the machinery and background for these solutions. The tendency toward industrial self-government through coöperative means is best illustrated by examples in the field of industrial standardization, such as, adoption of safety codes for punch-presses and grinding-wheels, agreement on terms in specifications and contracts, and the work of the American Engineering Standards Committee.

Describes the standardization method, likening it to elementary local self-government. It is evolutionary, and is not likely to be the "industrial parliament" which it is proclaimed will supplant our existing legislative machinery, because each problem has to be solved by those responsible for the continuity of industry. Can the success of the movement be maintained in a complex structure? This will be determined by two fundamentals, the sincere and continuous effort to get solutions rather than mere decisions, and a real consensus of all groups concerned with each problem in regard to its solution rather than the enforcement of a decision by mere voting power.

*Avoid Moral Cowardice in Handling Men.* HAROLD B. BERGEN. Industrial Management, February, 1926, Vol. 71, No. 2, pp. 88.

Gives suggestions to supervisors as to ways of preventing a mediocre employee being allowed to hang on year after year until an attempt at a final separation, on the part of the company, is condemned as inhuman and unjust. Summarized they are: (1) a periodic and impartial study of the standing of each worker in the unit, (2) interviews at least twice a year with each person during which an attempt should be made to bring out his status in a constructive way, (3) encourage the statement of grievances and criticisms at these interviews, (4) at each promotion or wage adjustment call in the person concerned and tell why it has been made.

*Earning While Learning.* FRANCES MARY HUGHES. Office Economist, March, 1926, Vol. 8, No. 3, pp. 11, 13–14.

Selfridge and Company, London, England, aim to make their education department the means of developing to the utmost the human resources of the business.

Two divisions of the education department attempt to accomplish entirely different objectives. The continuation school furthers the education of the boys and girls taken into the organization by holding classes during business hours. This work is under a qualified principal and staff of teachers. The staff training section tries to make each member of the selling body as efficient as possible. At no time is a salesperson dismissed for inefficiency until an effort is made to help him or her over the difficulty. An example of their methods is shown by the open discussion of letters of complaint or appreciation. The group or sub-department concerned is called together and the letter read to them. If one of condemnation it is freely discussed, group spirit is aroused and the offense is not likely to be repeated.

*A Diagnosis Test of Aptitude for Clerical Office Work.* A. M. RUGGLES. Teachers College Contributions to Education, No. 148, 1924.

Analyzes clerical work into general duties, and classifies them into a clerical

performance scale, ranging from the simplest to the most difficult. Six fundamental duties were decided upon and used as the basis for a set of six tests: (1) checking of material for correspondence with copy or similar material, with which it is compared for sameness, (2) selection of data on the basis of comparison, (3) locating in an alphabetical list, (4) classification or sorting, (5) tabulation or selection and transfer of data, (6) mathematical computations.

Discusses the criteria of clerical success, two being used, one called an "aptitude criterion," and the other an "efficiency criterion."

Studies the weighting of errors in scoring. Using the Thurstone scoring formula the weighting of errors is determined which gives the highest correlation with the aptitude criterion. Weighting of errors in a test can not be escaped since ignoring them means weighting them zero. Regression equations are derived for determining the weights to use in combining the tests into a battery.

*Combating Absences and Tardiness in the Office.* J. Paul Atwood. Office Economist, March, 1926, Vol. 8, No. 3, pp. 5–6.

Surveys various methods employed to overcome the evils of absence and lateness of employees. The old and fundamental appeals of reward and punishment still persist in many places but some of the modifications and experiments are: cash bonuses for varying periods of perfect record; the incentive of extra vacation or time off; competition between departments; publishing names and photographs in the house organ; and in some cases attempts to remedy the fundamental causes of delinquency by trying to help the employees solve their problems.

*Judging Organization and Personnel in the Financial and Industrial Investigation.* Arthur Andersen. Management and Administration in Manufacturing Industries, February, 1926, Vol. 11, No. 2, pp. 113–117.

Emphasizes the importance of good organization and personnel in the effectiveness of management. Discusses broad tests of correct organization and personnel such as; the effectiveness of management as shown by history of sales, history of earnings and net worth, *esprit d'corps*, etc. Detailed tests of organization involve analysis along standardized lines and necessitate the use of organization charts. When these are prepared analysis should determine points of strength or weakness. Is there a clear definition of functions? Are some men charged with several functions? Is functionalization and centralization of authority and responsibility laid out on a sound basis? Is there provision for carrying on the work in case "key" executives drop out?

Goes into detail on such topics as organization balance, relations of organization and personnel, functions of committees, personal statistics, qualifications required of the personnel and the fitness of the men occupying the various positions.

*The Barth Standard Wage Scale.* Carl G. Barth. Management in Manufacturing, December, 1925, Vol. 10, No. 6, p. 357.

Describes the construction of a wage-scale built on geometrical progression rather than on arithmetical progression and gives the reasons therefor as a result of the author's experiences. The ratio, or variation, is established at 15 per cent, so beginning at 10 cents an hour the figures may be read directly from a slide-rule, as follows: 10, 12, 14, 16, 18, 21, 24, 28, 32, 37, 43, 49, 56, 64, 74, 85, 98, 113, 130, 150, 172, 198, 228, 262, 300. Fractions are eliminated thus saving much clerical work.

The scale is analagous to Weber's law of discrimination.

*Can Laboratory Experiments on Output Throw Light on Problems of Industrial Fatigue?* H. M. Vernon. British Journal of Psychology, April, 1925, Vol. 15, No. 4, pp. 393–404.

Describes laboratory experiments to determine fatigue of industrial workers, value of rest periods, and value of results in general application to industry.

Tests were performed to resemble industrial conditions as closely as possible. Tests could not be used which had a direct

relation to industry because of difficulty in getting appropriate machinery or required material in sufficient quantities. A very small number of subjects were used in each test, usually from one to three.

Concludes that to obtain information which can be directly applied to industrial problems it is necessary to collect this information strictly under industrial conditions.

*Finding the Worth of a Man's Work.* J. OSBORNE HOPWOOD. Industrial Management, March 1926, Vol. 71, No. 3, pp. 176–184.

Describes methods of finding relative values of different kinds of work in an organization. Uses Army tests, designating men by indicating their capacities in a range of selective activity, as an example of grading men and jobs in an organization.

Job analysis from top to bottom is necessary, with requirements, limits and grades of activity needed, carefully enumerated.

Positions divided according to degrees of responsibility, to selectivity needed, from those requiring imagination, reasoning and discrimination, down to those requiring reflexes—mechanical operation.

Divides and classifies position in organization as follows:

1. General management (with subgrades *A*, *B*, *C*).
2. Departmental management (subgrades *A* to *D*).
3. Major supervision (with divisions).
4. Skilled service (with divisions).
5, 6, 7, 8. Graded down to manual service from 4.

Concludes that Army tests show that in representative groups more men are fitted for the more responsible positions than there are jobs; hence a need for sound classification and division.

*Guaranteeing Full-time Earnings.* H. FELDMAN. Industrial Management, March, 1926, Vol., 71, No. 3, pp. 133–138.

Tells experience of Crocker-McElwain Company and Chemical Paper Manufacturing Company, pioneers in the field of guaranteeing full time earnings.

The plan of guaranteeing full time wages to shop workers of five years experience has proved satisfactory to the management. Overtime is balanced against lay-off for each period of four weeks. Plan differs from others in that: (1) was voluntarily adopted by company; (2) gives full compensation for *all* lay-offs; (3) terminable only after four weeks notice, and in case of unavoidable circumstances.

Expense depends upon number of employers staying five years. Turnover is decreased. In five years since adoption the number of five-year men have increased from 9½ to 45½ per cent. Full time guarantee is not as expensive as might be expected; it causes economies from workers increased coöperation and full utilization of men; it stimulates planning for even production.

Men with guarantee are only discharged for serious negligence or incompetency and after case is reviewed by general manager.

Unions oppose plan because it weans away support of the men. It competes with unions to benefit worker.

*Helping the Salesman to Sell Where the Profit Lies.* J. J. WITHERSPOON. Printers Ink, February, 1926, Vol. 12, No. 2, pp. 65–69.

Describes methods used by a successful sales manager to develop salesmen into purchasing agents for the retailer. There are three types of salesmen: (1) those who are born to sell; (2) those who must be trained; and, (3) others who can never be much more than order takers.

Helping the salesman to sell where the profit lies, involves three things:

1. The most explicit thought about every point of merit in the articles to be featured.
2. A comprehensive understanding of all the many forms of mechanical assistance to the salesmen and to the dealer.
3. A great big comprehension of human nature as it affects both the salesman and the dealer.

*The Permanence of Vocational Interests after Three Years.* E. EARLE FRANKLIN. School and Society, April 3, 1926, Vol. 23, No. 588, pp. 438–440.

Reports results of experiments showing

high degree of permanence of vocational interests during high school period. Sixty-eight percent of boys and 77 percent of girls or 74 percent of entire group, adhered to their original types of vocational interests throughout their junior high school careers. Three out of 5 still cling to the actual choices which they originally expressed. The high degree of constancy of interests over a long period of time indicates that the interests expressed by entering junior high school pupils are significant and worthy of consideration.

Shows relationship of intelligence to elimination from high school. A boy entering junior high school is a third again as likely to be eliminated during the three-year period as is a girl. The probability that a student will survive is evidently dependent directly upon his intelligence. Pupils of less than average intelligence are one and three-quarters as likely to be eliminated during the three-year period as are those of superior skill.

Shows relation of interest to elimination. A boy with a professional interest is twice as likely to spend the full three years in the junior high school as is his comrade with a non-professional interest. For entire group, the children with professional interests are 30 percent more likely to survive than those with non-professional preferences.

*The Rise of Employee-Stock-Ownership.* ORDWAY TEAD. Industrial Management, March, 1926, Vol. 71, No. 3, pp. 157–160.

Discusses the possibilities and dangers of the trend of a systematic stock-selling campaign among employees in business and industry, from the point of view of the motives for such a scheme.

The motives most generally prevalent in modern industries are: (1) To encourage thrift among their employees, making arrangement for easy installment payments, sometimes with a promise to add to the employee's contribution a substantial amount. (2) To stabilize employment conditions by means of the method in the first motive. (3) To lessen the possibilities of labor unrest, in that it gives a wider distribution of purchasing power, which is a basic condition of continued success and prosperity. (4) To offer an incentive and supplement to the income of the employee; that is, letting the workers prosper with the company. (5) The belief that there is a valuable educational by-product of these plans. (6) To improve company morale, as the workers will apply themselves more faithfully, realizing their taste of part-ownership. (7) To change the character of ownership away from absentee proprietorship toward control by resident and active agents in the business.

Benefits to the employee are affected widely by each of these motives. Usually employees are running a risk when they place all their "eggs" of saving in one basket, that of their employer.

The "voting stock" affects the workings of the schemes which are based on the above motives, there being both advantages and disadvantages.

The criticisms of trade unionists and radicals are rather interesting. One is that employee stock-ownership tends to put employees into possession of a "capitalistic psychology."

This movement represents an experiment in the democratizing of the corporate form. There are many dangers and difficulties in its plans, but the movement continues to grow, and there are plenty of arguments pro and con, but no general conclusions of endorsement or rejection seem possible.

*Some Practical Aspects of Voluntary Arbitration of Labor Disputes.* D. L. HOOPINGARNER. Harvard Business Review, April, 1926, Vol. 4, No. 3, pp. 297–302.

Voluntary Arbitration of Labor disputes is the foundation on which peace in industry must be built. It is not merely a good theory but it is practical. It has not been successful in the past because of its inherent defects and certain contributing influences. Its future success depends upon:

1. Definite agreement of conflicting parties on the issue. Heretofore the parties have failed to come to agreement as to the issue itself, giving the arbitrator nothing to work with.

2. Parties must find an arbitrator agreeable to both who will prove impartial.
3. Both parties must be fair in the statement of their case, stating the truth and all the truth.
4. Non-use of arbitration as a stalking horse in order to get backing of public.

The use of the common conference system is being used more and more in attaining peace. The public receives protection for it protects both capital and labor, and they are the public.

Good will in industry spells the success of the system. "Industry in its control of labor policy must be established and conducted on a coöperation, not a conflict basis."

*Promoting Employee Teamwork and Welfare Without Paternalism.* C. A. Lippincott. Industrial Management, March, 1926, Vol. 71, No. 3, pp. 146–150.

Discusses the barrier that grew up between the employer and the employee after the introduction of machine methods. Impersonal character of the corporation did not result in the personal loyalty and interest of the employee.

The problem is one of mutual confidence and good will. Welfare plans fail to bring this about. Paternalistic attitude resented by workers. Common welfare plans are not ethical—they destroy self respect. They are not economic—they give something for nothing which cannot be reconciled with business principles.

Describes the methods employed by the Studebaker Corporation. Gives the plans devised for extra yearly payment to workers, vacations, pensions, purchase of stock and insurance.

Concludes that results are reduction of labor turnover and increase in the earnings of employees. There was a reduction in the cost of the product and greater loyalty and efficiency on the part of the employees.

*Industrial Medical Service Faces Barriers to Progress.* J. W. McConnell. The Nation's Health, March, 1926, Vol. 8, No. 3, pp. 168–169.

Describes value of medical service in industry, and cites barriers to progress. Scientific selection of workers, their development along particular lines of endeavor, their subsequent placement based upon mental and physical requirements of the job, and finally their maintenance and retention in a given industry are advances of science designed to produce maximum production at minimum cost.

Only 76 of the 193 large factories in Philadelphia employing 300 or over have organized medical service.

Factors which contribute to failure of industrial service are: (1) The incompetent physician. Graduates take jobs to tide them over until their practices are well established, and plant physicians are unethical in ignoring advice and soliciting patients of family doctors. (2) The omission of instructions stressing industrial requirements in university courses brings about the trial and error method. (3) Unsympathetic health officers omit industrial health on their programs. Some are not interested while others cannot get appropriations. (4) The careless plant manager does not utilize the medical department to the greatest advantage. Departments lack authority and complete equipment, and the selection of the physician is left to subordinates who are more interested in personal attributes than in ability. (5) The failure of small plants to organize joint industrial medical service which would make complete service possible at a low cost.

The successful industrial physician must have a knowledge of processes within the plant, materials used, sources of danger and expertness required of workers for the various jobs in order to select men who are mentally and physically able to fill occurring vacancies. He must exclude and control communicable diseases, and cause the worker's productiveness to remain at a maximum commensurate with his ability without endangering himself or causing injury to others.

# News Notes

## PERSONNEL RESEARCH FEDERATION

### *New Members*

By action of the Administrative Board the following new members have been added to the Register of Approved Organizations and admitted to corporate membership in the Personnel Research Federation:

Stanford University, Stanford University, California. Represented by President R. Lyman Wilbur.

White Motor Company, Cleveland, Ohio. Represented by Thomas H. White.

### *Activities of Member Organizations*

#### *Syracuse University: Investigation of Attitudes and Opinions*

There is under way at Syracuse University an investigation of the attitudes and opinions of the entire student body upon numerous questions of campus life. In all, 74 items are covered, including questions upon curriculum, methods of teaching, university regulations, problem of freedom of speech, military training, value and effect of fraternities, advantages and disadvantages of co-education, athletic problems, and the effect of college upon religious views. Almost a year was spent upon the preparation of the study. This preparation comprised the collection of a large number of attitudes among students by a student committee, editing and arranging these attitudes into suitable scales, and putting the study into suitable form through coöperation with administrative officers of the university. On May 10 this attitude study was administered to the entire student body at one time. Two hours were required for the students to check their responses.

An effort was made not only to construct the scales according to psychological principles and with gradations of attitudes or steps, but also to provide, by cross-comparisons and correlations, for the discovery of underlying motives and forces in social behavior not revealed by the mere expression of opinion. One feature of the study is to determine the degree of personnel service of any sort rendered by any agencies to the students, and also the kinds and degrees of personnel service of which students have felt the need, but have been unable to obtain. It is hoped that the study may be generally useful to the personnel program which is contemplated at Syracuse in presenting the various problems of student adjustment from the standpoint of the students themselves.

The study is being carried on through the agency of the School of Citizenship and Public Affairs at Syracuse University, under the direction of Dr. Floyd H. Allport.

#### *Columbia University*

Many members of the faculty and staff of Columbia University are active in different phases of personnel research and administration. Some of the activities in educational personnel research and student guidance are reported here. Industrial personnel research and vocational guidance will be reserved for treatment in a later statement.

Professor Adam LeRoy Jones, the university's representative in Personnel Research Federation, directs the Office of University Admissions. Studies of the predictive value of the Thorndike Intelligence Tests used for admission to Columbia College by this office for several years have steadily increased confidence in the tests. Their use has now been extended to include Barnard College. Determination of the predictive power of the entrance tests

depends upon the adequacy of the criteria against which they are measured. Efforts are being made to increase the reliability of college marks and so to obtain better measures of college success. Professor Jones is also chairman of the Committee on College Personnel Technique of the Association of American Colleges which has recently reported on types of special examinations for entering freshmen and on the use of "Freshman Week."

Dean Herbert E. Hawkes, of Columbia College, has been influential in the organization of the Intercollegiate Council on Personnel Methods which has undertaken a survey of the methods now in use in fourteen institutions. Student guidance in Columbia College is handled practically and effectively. The Dean keeps open office for three or four hours every day, the time being devoted almost entirely to student interviews. There are seven official Assistants to the Dean. To each of these is assigned a group of students possessing some natural common point of interest, or looking forward to a certain professional school. Conferences are held frequently between the Dean, these assistants, and others concerned in student problems, such as the Director of the Bureau of Appointments, the person in charge of religious work, the men on the staff of the Department of Admissions who are interviewing students all the time, and representatives from the Secretary's office. In this way the personnel problem is approached from a number of different angles, common problems discussed, and plans for coöperative procedure developed. Cumulative record cards, on which is placed all of the information about students which the college is able to secure through any means, are centralized in the Dean's office. These are an indispensable aid in the personnel service of the college. They are kept up to date on a weekly basis and new uses for them are constantly being found.

Professor Ben D. Wood is director of the Achievement Test Research under the auspices of the Bureau of Collegiate Educational Research of Columbia College. He is conducting and coördinating studies toward measuring defined achievements more exactly, more objectively and more meaningfully. Trials of new-type objective examinations in the law and medical schools and at the end of courses in the college are meeting with gratifying success. Improvements in technique are being made on the basis of evidence as to the special adaptabilities of certain forms of objective questions to certain subject matters, and the best ways of scoring various forms of objective questions.[1] From such researches will come ultimately the needed criteria of defined achievement in college and professional school courses against which to measure the significance of various predictive devices such as intelligence tests, placement tests, letters of recommendation, interviews, secondary school records, etc.

In connection with the search for better methods of measurement a survey has been made of college examinations.[2] Files of June 1925 final examinations were received from 65 American and Canadian colleges and universities. These included more than 7000 separate examinations covering over 40 general divisions of subject matter. Contrary to general opinion it was found that the use of new-type question forms is not confined to a few institutions nor to a few subject matters. About 500 of the examinations contained significant proportions of objective questions and 210 were made up predominantly of objective questions. On the other hand there was much evidence to indicate the use of examinations by teachers as punitive and disciplinary devices rather than as means of gaining accurate measures of defined achievement in comparable and meaningful terms. This undesirable tendency in the examination system of American colleges is an important one for personnel officers to combat in view of the increasing number of student failures.

A three-year study of the use of objec-

[1] A series of articles on these topics was published in the *Journal of Educational Psychology*, January, February and April, 1926.

[2] Report submitted to National Research Council for publication.

tive placement tests in modern languages, mathematics, physics, English and history has just been completed. Initial misplacement of students on the basis of unreliable previous records or examination marks is the cause of many failures. The use of placement tests thus far has materially decreased the proportion of failures in the courses in which they have been used, and has also contributed to efficiency of instruction by providing more homogeneous classes—notably in English, modern languages and physics. The placement test scores have given in every case higher correlations with college marks than were given by the old type entrance examination marks. It is probable that the placement tests, like the intelligence tests used for admission, will become a permanent part of the college personnel program.

### *Problems of Educational Personnel Administration*

Professor Wood offered a course on Problems of Educational Personnel Administration for the first time last summer at Teachers College. It was attended by representative educational administrators from many colleges and secondary schools. The procedure followed was that of assigning topics to committees and individuals in the class for study and report. A considerable amount of useful material was accumulated which Professor Wood has kindly submitted for brief summary here. The topics covered by committees, and abstracts of certain reports follow.[3]

*The Personnel Director.* Committee: Leslie Leland, W. W. McKinahan, Mildred Moore, Mildred Rosenstiel, F. J. Weersing.

The personnel director in a college or university serves primarily in an advisory capacity—to the President, to the Deans, to the faculty, and particularly to the students. He studies the collective and individual needs of the students and the best ways to meet them. Within the scope of his activities are the direction, conduct, or advisory coöperation in: (1) record-keeping of data concerning students; (2) research and surveys pertaining to causes of scholastic success and failure, selection of students for admission, examination methods, psychological tests, guidance, occupational opportunities, etc.; (3) health supervision and mental hygiene; (4) student counseling—personal, educational and vocational; (5) placement service and follow-ups; (6) conferences with deans and officers of instruction and administration. There should be close coöperation with the departments of psychology and education in matters of research.

Among the qualifications of a personnel director are mentioned: good scholastic attainments in college; graduate work in psychology and education; experience in teaching and administration; a broad knowledge of, and some first hand contact with occupational opportunities open to graduating students. On the personal side he should have a deep interest in individuals, tact, courtesy, patience, and more humility than is common among administrators.

*Cumulative record card.* Committee: John N. Bennett, Margaret R. Davidson, Alma Fletcher, T. W. Fowle, S. R. Grimm, Leslie Leland, E. L. Morphet, Jessie T. Oldt, Ethel M. Parmenter, T. G. Reed.

The first essential of educational personnel administration is learning the nature and needs of the students. From childhood to the top of the educational ladder proper guidance is dependent upon complete, detailed and accurate information concerning each individual. To this end a permanent cumulative record card for each student is desirable from which successive teachers or advisers may obtain full data as to a student's achievements, abilities, interests, aptitudes and personality.

The committee drafted such a card in the form of a $9\frac{1}{2}$ x $11\frac{3}{4}$ inch folder. The plan suggested was that these cards be kept as a permanent record in a central bureau and filled in by clerks from feeder cards. The latter would be filled out by

[3] Where possible the Personnel Research Federation will be glad to put interested persons in contact with the authors of these papers.

classroom teachers, visiting teachers, physicians, counselors and others competent to furnish accurately the items of information desired. The main divisions of the permanent cumulative card as submitted are: (1) family history; (2) test record-intelligence, achievement, and other tests; (3) scholastic record; (4) record of special interests and activities; (5) record of facts regarding personality and mental hygiene, including a series of personality ratings; (6) cumulative graph showing scholastic achievement of the student from year to year; (7) health and physical development record; (8) record of vocational interests and experiences.

A number of sample feeder cards were also prepared by members of the committee and papers presented dealing in detail with the following: Family history record; Occupational history record; Special interests and activities record; Individual diagnosis and record card; Personality report feeder card; Vocational interests and aptitudes record; A cumulative record card for a woman's college; Tests and a method of determining and recording pupil marks so as to be meaningful and comparable throughout the entire country; Records of scholastic achievement for a cumulative record card; Non-academic preparation for college work; A tabulation of items called for on personnel record blanks in use at 81 colleges and universities. (Note: This tabulation and two similar studies of personnel records are discussed elsewhere in the News Notes of this issue of THE JOURNAL OF PERSONNEL RESEARCH.)

*The Interview.* Committee: Mina L. Blount, F. F. Bradshaw, E. C. Deputy, Alma Fletcher, Mr. and Mrs. C. O. Matthews, F. Roehm, J. M. Starrett, Sister Rose, Charlotte L. Stoakley.

Differentiates three main types of interview: the exploratory personnel interview, the interview for educational guidance, and the interview for vocational guidance. Enumerates general principles applicable to all three types, among which may be mentioned the following: (1) The basis of successful interviewing is a preview gained from cumulative personnel records. (2) Interviewing should be utilized only for purposes which cannot be effectively attained without it, such as giving the interviewed confidence in the motives and methods of the interviewer and the institution which he represents, getting facts which may not be revealed in written records owing to affective associations and which may furnish clues to maladjustments, giving information or advice which may be received with emotional reactions, etc. (3) The attitude of the interviewer is important—he should generally be cheerful and at ease, exhibiting understanding without marked sympathy, surprise, approval, or condemnation. (4) The interview should be organized somewhat as follows:

a. Establishment of confidence by telling of personnel point of view and showing personal interest and understanding.
b. Asking definitely framed questions of diagnostic value.
c. Giving interviewed opportunity for spontaneous expression.
d. Giving any information or advice which may be relevant, especially that which may illustrate the interviewer's ability to be of service.
e. Closing the interview in such a way as to emphasize permanence of relationship which has been established, the ability of interviewed to help himself, and the presumption that he will be welcome to return for a follow-up interview.

(5) The interview should always be followed with a review after a sufficient lapse of time to make it significant. This review should usually include a second interview. (6) Interviewers would do well to be very cautious in making judgments of personality, to take action tentatively, and to give advice sparingly with emphasis on the necessity for thought and initiative on the part of the interviewed.

Suggests possible lines of procedure for coöperative scientific study of interview technique.

Francis F. Bradshaw has assembled the reading done by the committee on the interview into a bibliography which is

printed elsewhere in this issue of THE JOURNAL OF PERSONNEL RESEARCH.

The titles of individual papers discussing other aspects of the interview were as follows: Mental Hygiene and the Personnel Program; The Fact Finding and Fact Giving Phase of the Interview; The Educational Interview; Qualifications of Interviewers; Circumstances Affecting the Success of the Interview; An Evaluation of the Interview; The Vocational Interview; The Personnel Interview as a Unit of Measurement in Vocational Guidance.

*Personality Ratings.* Committee: Mr. C. O. Matthews, Mrs. C. O. Matthews, Donald Snedden.

Papers were submitted dealing respectively with the technique of rating, what traits should be rated, and the value of ratings. The first discusses a number of studies of rating scales, the factors affecting their reliability and validity, and gives a bibliography and summary of suggestions that have been made for improving ratings. The second throws light on the traits most frequently rated through an analysis and tabulation of traits mentioned in 30 different rating scales and personality studies. The third presents instances of the unreliability of ratings found in certain studies and advises personnel workers against relying too heavily on ratings.

*Miscellaneous Special Reports.* Measuring Special Interests and Abilities, by C. B. Eavey; Education of the Brilliant Child, by T. W. Fowle; Factors in Vocational Selection, by Hazel M. Lewis; Subjective Measurements, by John T. Morris; Personnel Administration as a Means for Reducing Student Mortality in Colleges, by F. J. Weersing.

### COLLEGE PERSONNEL RECORD CARDS

Recent studies of college and university personnel record cards have been made by Miss Zoe Emily Leatherman, Ohio State University; Miss Alma Fletcher, St. Louis Public School System, and Dr. L. R. Geissler, Randolph Macon Woman's College, Lynchburg, Virginia.

The studies by Dr. Geissler and Miss Fletcher were made from record cards collected by the Personnel Research Federation in response to an inquiry on college placement services. One hundred and three institutions sent forms.

Dr. Geissler confined his study entirely to facts and avoided problems of interpretation and application. He found that there were five questions to which these record cards furnished fairly satisfactory answers:

1. What information is recorded regarding students, alumni, employers, employees and relatives of students and alumni?
2. For what purposes is the information desired?
3. From what sources is the information obtained?
4. What agencies desire to collect various items of information?
5. What are the most important items of information desired by the various collecting agencies; such as, general information, genealogical records, physical data, character analysis, educational history, vocational data, and post-collegiate activity.

Miss Fletcher's study, covering the records of 81 colleges and universities, was made with the thought of simplifying and standardizing record cards. The main classifications of her work were: names of records tabulated, frequencies of questions appearing on the records, and ambiguities appearing in the records. From this survey Miss Fletcher pointed out that before adequate record blanks can be constructed some preliminary problems must be solved; for instance, which questions are necessary and how many can be eliminated; how to organize questions so as to elicit exact information required for specific duties in accordance with a specified college plan; and the standardization of terminology and methodology. She suggests the following experiments to assist in solving these problems: (1) tryout of a standardized personnel record; (2) have Educational Personnel Administration Committee work on a personnel record; (3) have

colleges agree on terminology; (4) have colleges report to Personnel Research Bureau results of tryout on standardized records; (5) have colleges study which questions are effective.

In a proposed outline for personnel record submitted by Miss Fletcher the main headings are:

1. Physical fitness
   a. heredity
   b. health
2. Intellectual fitness
   a. general intelligence
3. Emotional, temperamental and social fitness
   a. temperament
   b. emotional and social adjustment
4. Motor capacities
5. Study methods
   a. Class preparation and performance
   b. Examination preparation and performance
   c. extra-curricular activities
   d. time-amount and distribution
   e. present schedule
6. Placement
   a. preparation for present course
   b. aptitude for profession.

In preparation for her present study "Personnel Record Blanks Used in Colleges" Miss Leatherman sent letters to 315 colleges and universities requesting copies of "all blanks used in recording personal information about students other than their academic grades." Two hundred and four replies were received. This was the next step following a previous study of maladjustment among college students made by Miss Leatherman and Dr. E. A. Doll, in which the conclusion was reached that in addition to vocational and educational guidance there must be available more individual assistance to deal with all the interplay of forces affecting the personal life of the student, who, though above the average mentally, is unable to use it to the fullest advantage because of fears, inhibitions, worries and other emotional handicaps. The first requirement in attempting to remove these hindrances is to know in detail the personal history of the individual.

On the basis of preliminary observation of the blanks collected, Miss Leatherman feels that the following generalizations are justified:

1. The wide divergence of practice in the matter of securing personal data seems to point toward a need for study of the situation with a view to clarifying the aims of gathering such information.
2. There is evidently an unnecessary amount of duplication on nearly every campus in the securing of personal data.
3. A set of syllabi on various types of student problems would probably be valuable.
4. The development and standardization of interview technique is especially important.
5. The prediction of maladjustment by a study of the entering student is one of the possibilities of future research.
6. There is possibly a place in the college for a field worker comparable to the visiting teacher—one who would bring the home and the college into more vital contact than is possible through the medium of letters or impersonal questionnaires.

This survey is a step toward the formulating of adequate personnel blanks based on the evaluation of present practices. A complete analysis of the questions asked, the method of asking them, the type of blanks used, and the formulation of a suggested personal history blank will be given to a later report.

### METHODS OF RESEARCH IN INDUSTRIAL RELATIONS

A committee of the Personnel Research Federation on Methods of Research in Industrial Relations has been holding informal conferences from time to time at which the methods used in current investigations have been presented for discussion and criticism.

On April 30, Dr. W. A. Berridge, of Brown University, presented numerous charts on statistical procedures for use in forecasting labor turnover. Some of Dr. Berridge's methods are described in the bulletin of Brown University entitled "Brown Business Service," April 13, 1926, copy of which has been sent to all members of the Personnel Research Federation. Miss Florence DuBois of the Metropolitan Life Insurance Company read a paper on "A Method for Measuring the Persistence of Labor."

At a similar conference called by this same committee on May 26, the topic was "Methods of Research in Employment Psychology." A general statement of approved research procedure was made by Dr. W. V. Bingham. Dr. Millicent Pond of the Scovill Manufacturing Company then described an investigation extending over the past two and one half years into the value of employment tests as aids in placement of newly hired workers in a factory.

### JOSEPH A. HOLMES SAFETY ASSOCIATION

The annual meeting of the Joseph A. Holmes Safety Association was held March 5, in the conference room of the United States Bureau of Mines, Washington, D. C.

Among the interesting reports given was that of the Standing Committee on Medal Awards for the Mining and Quarrying Industries. The committee cited the cases of those mine heroes whose acts of courage and self sacrifice were considered deserving of medals or diplomas.

A report of the 148 Joseph A. Holmes Chapters for the period of October 31, 1924, to March 1, 1926, was made by J. J. Forbes, Chief Engineer, Safety Extension Service Work. The report covered the number and condition of chapters and the work engaged in.

As stated in the certificate of incorporation, dated February 19, 1926, the purposes for which the Joseph A. Holmes Safety Association is formed are: "To promote the arts and sciences connected with safety and health in the mining, metallurgical, and allied industries, and the welfare of those employed in these industries by all lawful means; to make awards to be known as the "Holmes Safety Award," for the encouragement of those originating, developing, and (or) installing meritorious safety appliances, devices, or methods in the mining, quarrying, metallurgical, and allied industries; also the awarding of medals for personal heroism or distinguished service in the saving of life, in any branch of mining, quarrying, metallurgical, and allied industries."

### CITY EXAMINATIONS IN ST. PAUL

The City Employment Report of the Bureau of Civil Service, St. Paul, Minn., for the year 1925, states that the type of examinations used during the year tended more and more toward the multiple-choice-answer form and particularly toward the short-answer form. On pages 14 and 15 of this report is found a complete set of questions used in an examination for Gardener, illustrating the type of examination that has been found most successful, particularly for the class of applicants who seek positions in which the duties require little or no writing.

### FORTHCOMING MEETINGS

#### *American Management Association*

#### *General Fall Conference and Meeting of Production Executives*

The general fall conference of the American Management Association will be held October 11, 12 and 13 in Cleveland; headquarters at the Hotel Statler. The first day will be devoted to meetings of the Office Executives' Division and the Sales Executives' Division; the second and third days will be given over to general sessions.

"The Supervisory Forces—Their Selection, Development, Compensation, etc.," will be discussed at a conference of the production Executives' Division at Silver Bay, Lake George, New York, June 30, July 1 and 2, 1926.

On Wednesday afternoon, June 30, the topics for discussion will include "The Foreman as Manager" and "The Relation

of the Foreman to Staff Departments and Functions such as inspection, costs, planning, maintenance, engineering, and supply," not including personnel.

Wednesday evening will be devoted to "The Relation of the Foreman to Personnel Problems," including a paper on the representative functions of the personnel department and the foreman in regard to: (1) Employment, transfers and promotion, dismissals and quits. (2) Training employees. (3) Health, safety, sanitation and working conditions. (4) Discipline, including absence and lateness. (5) Time study, rate setting and methods of wage payment. There will also be a paper on the "Relation of the Foreman to his Men," including removing suspicion of rank and file toward the foreman.

On Thursday morning, July 1, three papers will be presented: "Rating Supervisors;" "Women in Supervisory Positions;" and "Supervisors—Their Qualifications and Selection."

Thursday afternoon will be devoted to "Foreman Development." The discussion will cover various phases of instruction for foremen. This subject will be continued in the evening with a discussion of Foremen's Clubs and Foremen's meetings on efficiency of operation.

Friday morning, July 2, will be devoted to a discussion of the compensation of supervisors with a paper on "Salary versus Bonus Methods" and a second paper on different methods of incentives for supervisors.

### *Silver Bay Conference on Human Relations in Industry*

The Ninth Annual Conference on Human Relations in Industry will be held at Silver Bay, Lake George, New York, August 26 to 29, 1926. This conference offers an opportunity to become informed on the trend of human relations and the most urgent problems confronting industry today. It is always characterized by a spirit of real fellowship, freedom in exchange of ideas, the presentation of vital subjects from various points of view, and messages born of long experience that contain helpful suggestions of practical methods. Last year's conference was attended by 596 delegates from 99 cities in 20 different states, Canada and 4 foreign countries. These delegates represented a true cross-section of industry—executives, managers, superintendents, engineers, foremen, personnel directors, workmen, members of labor unions and employee representation committees, and office workers as well as educators, Y. M. C. A. secretaries and professional men.

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## PERSONNEL RESEARCH FEDERATION: NEXT ANNUAL MEETING

The annual meeting of the Personnel Research Federation will be held at the Hotel Pennsylvania, New York, on Friday and Saturday, October 8th and 9th, 1926.

On Friday, the American Statistical Association will meet jointly with the Personnel Research Federation in a program devoted largely to the consideration of issues as to research procedure in labor turnover investigations. The program which is now being prepared will first raise the question, why study labor turnover, in the individual plant and its departments, in the industry, and in the labor market, local and national. The earlier hopes of using labor turnover data as measures of the effectiveness of personnel procedures have not been fully realized because of the difficulties of bringing the facts of turnover within a single plant or department into significant relationship with the facts about the labor market and the business cycle. It is time to ask again just what are the uses and limitations of labor turnover studies. Is there value, for example, in labor turnover figures as means of forecasting business conditions as well as conditions in the labor market and in the plant? What is the significance of these studies for industrial society as well as for

management in formulating labor policy? How can these studies best contribute to the problem of adjusting the demand and supply of labor?

Among the issues of statistical procedure to be raised are those which have to do with the weighting of data, when turnover ratios from large or small plants or districts are combined; the value of the median of such ratios as a measure of central tendency; the feasibility of agreement regarding the denominator to be used in the turnover formula; the best way of expressing trend; the best practicable means of collecting labor turnover statistics in State labor bureaus; and necessary precautions in interpretation of turnover data. Several concrete studies will be presented as a basis for discussion of research method.

At the sessions on Saturday the annual business meeting of corporate members will be held at which will be presented a summary of the year's progress in personnel research among the university members, the government agencies and the business concerns affiliated with the Federation. The election of the Administrative Board will take place and minor changes in the constitution looking toward a strengthening of the organization will be voted upon. The advisability of a revision in the sale of annual dues will be considered.

A report of the standing committee on Methods of Research in Industrial Relations will be a feature of this day's program. Papers dealing with problems of educational personnel administration and student guidance will not be presented at this meeting inasmuch as it was decided at the recent Minneapolis conference to devote a special meeting of the Federation to these subjects at a later date when more time will be available for thorough consideration of these important aspects of the Federation's program.

An invitation is extended to readers of the JOURNAL OF PERSONNEL RESEARCH, and all who are interested, to attend the general sessions. Attendance at the business meeting is limited to members. Details of the program will be sent to members, and to others who address the office of the Personnel Research Federation, 40 West Fortieth Street, New York.

# Procedure in Making an Industrial Relations Survey

By Glenn A. Bowers, *Industrial Relations Counselors, Incorporated*

*To carry the ideals of disinterested and accurate fact-finding and of scientific method into the highly personal and controversial realm of industrial relations is one of the purposes of the Personnel Research Federation. To this end, informal conferences of investigators are held from time to time under the auspices of the Committee on Methods of Research.*
*The following statement of procedure was presented for critical consideration at such a conference. Mr. Bowers' emphasis on the necessity for sharp separation of the facts from the investigator's appraisal or interpretation of them, met with decided endorsement.*

THE following statement of procedure followed by the Industrial Relations Counselors, Inc. (formerly the Industrial Relations Staff of Curtis, Fosdick & Belknap) in making an industrial relations survey of a company or industry has been evolved over a period of four years and is subject to improvement as further experience dictates. This procedure is a definite one although time and circumstances necessarily alter the steps to be taken in different cases. The principal objective has been the nearest possible approach to scientific research method.

Both management and industrial relations research deal primarily with the human factor. Just as management is in part an art and in part a science, so personnel research in industry relies upon both art and science. The *art* of assaying human values and of coördinating them is a very old one. The complex modern industrial life has, however, placed a heavy strain upon this method of avoiding or resolving industrial conflict. Happily, those who deal today with problems involving employes at work are taking advantage of increased knowledge of various sciences and are relying, insofar as is possible, on the scientific method.

The method of the scientist involves first of all an impersonal approach to his problem; second, a knowledge of its environment; third, a definite plan of procedure; fourth, the first-hand assembly of all pertinent information and its isolation as objective data; and fifth, an analytical

appraisal of his findings in light of all available knowledge.

Complete reliance upon an *impersonal analysis* of an industrial relations problem would doubtless fall as far short of a true picture as complete reliance upon *impressions of investigators* has so often done. Each must be applied in proper proportion, and judiciously. The difficulty of being objective in one's observations is due to the state of mind left by countless experiences which affect the manner of one's approach and the recording of one's facts. Few, if any, are able to emancipate themselves from their subjective egos. If this is sufficient ground, therefore, to doubt the possibility of being truly scientific in industrial relations research, it is yet desirable to be as scientific as we can. Even though the procedure herein outlined be regarded as having little resemblance to the scientific method, there would yet seem to be sufficient advantage in the clarity and convenience resulting from the procedure outlined below to justify a continued use of it. As William James has said, "The spirit and principles of science are mere affairs of method; there is nothing in them that need hinder science from dealing successfully with a world in which personal forces are the starting point of new effects."

Whatever the view taken with respect to the possibility of being scientific in industrial relations research, there is a growing appreciation among industrial and social investigators of the need for isolation of facts not only by dividing them into small units but by separating them from opinions and impressions of the investigators as far as possible.[1]

In the application of the above principles to industrial research, a procedure has been evolved by the staff of the Industrial Relations Counselors, Inc., which makes available through subject research the highest attained standards which are applicable to the situation; which sets up in a given case a comprehensive impersonal description of the situation in the form of an agreed statement of facts; and which permits as a separate process the drawing of conclusions and the expression of opinions and recommendations. This method aims to give the reader in the final written report three things: the premises or measuring stick in the form of applicable standards; the facts of the case (to which competent representatives of the industry involved have agreed); and finally, the conclusions and recommendations of the investigators, tempered by the judgment of other members of the staff, whereby

[1] J. S. Mill, Logic book iii, ch. vii, § 1: "The order of nature as perceived at a first glance presents at every instant a chaos followed by another chaos. We must decompose each chaos into single facts. We must learn to see in the chaotic antecedent a multitude of distinct antecedents, in the chaotic consequent a multitude of distinct consequents. This, supposing it done, will not of itself tell us on which of the antecedents each consequent is invariably attendant. To determine that point, we must endeavor to effect a separation of the facts from one another, not in our minds only, but in nature. The mental analysis, however, must take place first, and everyone knows that in the mode of performing it, one intellect differs immensely from another."

the existing situation might be transformed into an attainable ideal. In the "fact" section, qualitative adjectives are omitted and an effort is made to remove all "color" which is likely to influence the mind of the reader as to the desirability or undesirability of the situation described.

At this point, attention may be called to the contrast of this method of presentation with one used by many investigators with unassailable reputations for integrity, accuracy, and objective-mindedness. The research methods of this group of investigators have doubtless coincided in many respects with the steps herein outlined—up to the point of presenting the material in written form. Research reports prepared by these persons have been presented as integrated units in which standards, practices, opinions, and philosophy have been so intermingled that the reader has no clear basis for testing the judgment of the author. There is frequently no other course than to accept or reject in toto the thesis of the author. Such a method of presentation has much to be said in its favor when used by one who is propounding a philosophy or a conception which he would like to have others accept or presenting a picture which he would have others see through his eyes. This form, however, although used by otherwise scientific persons, appears very similar to that of the ordinary propagandist. The difference can be detected only by skilled critics who are informed on the subject presented. Relatively few readers occupy this position on any subject. No plea is here made for the universal adoption of the practice of separating fact and opinion in industrial books. Many are the cases in which the integrated form may be the more desirable. *The sole point here is that the scope of industrial research includes the presentation of the study and that the investigator destroys the scientific character of his work when he obscures the facts with his opinions.*

The procedure in each survey of the Industrial Relations Counselors, Inc. may be divided into four major parts: preparation; assembly of data and information; organization and presentation of material gathered; and, finally, analysis and conclusions. As stated in the beginning, circumstances alter the steps to be taken in different cases. The following is the usual course of events:

*Preparation*

1. Client-counsel contact is established by the Industrial Relations Counsel
2. Specifications for the particular task are drawn for the general guidance of the survey director and investigators assigned to the case
3. A special check list of the items to be covered in the survey is prepared for use of the field investigators, and typical forms drawn for recording statistical data
4. A conference of all connected with the field investigation is held

*Assembly of data and information*

5. A study is made of all available published information
6. The field investigators are introduced by the Industrial Relations Counsel to the officers of the industry
7. Field investigation is made during which informal progress reports are rendered to the Industrial Rela-

tions Counsel. (Investigators are presumed to have discretion, tact, and knowledge of their subjects so that detailed reports as to movements are not required)

*Organization and presentation of data*

8. The field work having been completed, a preliminary outline for the report is prepared
9. Conferences are held with the staff statistician on tabulations and charts as aids to analysis and for inclusion in the report
10. Joint staff review of outline of report and tentative schedule for completion of various parts
11. Preparation of first draft
12. Joint staff review of first draft
13. Preparation of second draft involving staff editor
14. Final check on statistical data
15. Joint staff review of second draft
16. Verification of data by responsible persons in the industry
17. Preparation of final draft
18. Delivery of report

In the preparation of the written report, the Industrial Relations Counsel is responsible for the drafts of applicable standards, the field men prepare drafts of descriptive material on their respective subjects, and all drafts are reviewed and conclusions are drawn in conference. Finally, the report is edited for coherence and clarity.

The scope of subject matter covered in a survey of this kind is indicated by the following typical outline of a report, showing only major subdivisions. Each of the numbered chapters except I is divided into three parts: 1. Applicable Standards; 2. Existing Practices; 3. Conclusions and Recommendations.

Foreword
Summary and Conclusions
I. Background
II. Organization and Administration
III. Employment
IV. Wages and Hours
V. Accident Prevention and Compensation
VI. Medical Service
VII. Sanitation
VIII. Housing
IX. Subsistence (Stores, eating places, etc.)
X. Service Work (Recreation, financial aid, insurance, pensions, savings plans, stock purchase plans, benefit associations, publications, etc.)
XI. Education and Training
XII. Joint Relations
XIII. Community Relations
Photographs
Exhibits

The comprehensive survey report above outlined is but the starting point for continuous consulting service. The report is merely a means to an end. It affords an orientation for all concerned with the labor problem and establishes the basis for intelligent planning of future problems. It is an effort to make available the pooled knowledge of a staff of specialists based upon practical experience and subject research. The procedure followed in subject research is based on the same principles as above outlined.

(*Manuscript received June 14, 1926.*)

# Measurement of Professional Attitudes

## Differences Between Lawyers, Physicians and Engineers[1]

By Karl M. Cowdery, *Stanford University*

*The statistical method of group interest analysis originated at Carnegie Institute of Technology is showing promise of considerable usefulness in vocational selection. It has already been employed with good results in differentiating the interests of successful salesmen from unsuccessful ones, design engineers from sales engineers, the mechanically from the socially inclined. Dr. Cowdery shows that the Interest Report Blank differentiates men with medical, engineering and legal interests with an efficiency of 80 to 90 per cent, and has a reliability ranging from 0.77 to 0.90.*

THIS exploratory study investigates some of the possibilities of using psychological and statistical analyses of expressed attitudes as supplementary evidence in connection with vocational classifications of individuals.

### AVAILABLE TECHNIQUES FOR OCCUPATIONAL ORIENTATION

Scientific measures of abilities and personal characteristics have, in the past two decades, added materially to the store of information available to students about themselves before or at the time when they must make decisions as to their future educational program and occupation. The minimum general intellectual ability necessary for various specific occupations and general vocational levels (the unskilled, semi-skilled, skilled and professional) has been more or less satisfactorily worked out, largely under the impetus of the United States Army Psychological Service during and after the World War. Some special ability tests have been constructed, notably the tests of musical ability of Seashore, the mechanical ability tests of Stenquist and of MacQuarrie, the engineering aptitude tests of Thurstone, etc., not to mention numerous ingenious special tests of particular local value in selecting

[1] This article, prepared with the helpful guidance of Dr. Lewis M. Terman, is a condensed summary of a thesis prepared under the direction of Drs. Edward K. Strong, Jr., and Truman L. Kelley, of Stanford University. The writer wishes to acknowledge his indebtedness to each of these. The present article does not include complete tabulations of test results for the different groups.

workers for specific tasks (as described by Link and Snow).

Within more recent years other phases of fitness for social service have received attention. Attempts are being made to evaluate personality and character traits, as by means of the Kent-Rosanoff free association method and its variants for identifying psychopathic mental trends, the Voelker, Cady, Raubenheimer and Laslett attacks upon the problem of testing delinquent and pre-delinquent tendencies, the so-called Will-Temperament test of Dr. June Downey, with its adaptations for group administration, and the Wyman free association test for an individual's social, intellectual and activity interests.

Individual differences of various kinds have been identified empirically, reasonably reliable methods of measurement have been devised and validated, but their usefulness for purposes of vocational and educational guidance has been limited. For problems such as that of the selection of a profession, general intelligence tests have little to offer after the important determination has been made that the individual has at least the minimum ability required for acquiring the training necessitated by any of the professions. The differences between the general intellectual requirements of the various professional fields are too small, as compared with the individual differences among the successful practitioners within the groups, to be of value. The special abilities demanded of prospective engineers have been at least tentatively approached in the vocational guidance tests of Thurstone. More complete validation of these and similar batteries for other professions are needed. Testing of the different character and personality measures against dependable criteria of success in various occupational fields is needed to determine what practical values these psychological devices have to offer to educational and vocational counselors.

Expressed primary preference for a particular occupation has been shown by Fryer, Proctor and others to be an inadequate guide to successful occupational choice. The type classification of interests of Wyman, the rather unsatisfactory evaluation of the significance and permanence of interest in school studies by Thorndike in this country and by Malsch in Germany, and, more recently, the work of a group at the Carnegie Institute of Technology, notably Max Freyd, B. V. Moore, and M. J. Ream, have suggested that the evaluation of expressed attitudes toward supplementary features of occupational life may offer a fertile field for study.

Interest analysis blanks calling for expressions of personal attitude toward various types of items have been demonstrated by Moore and Freyd to have moderate efficiency in segregating socially-inclined from mechanically-inclined individuals. Their value is limited to group distinctions only, according to results of the use of the technique of Freyd. Similarly Ream found limited value in this device for selecting life insur-

ance salesmen. Moore had greater success in segregating sales from design engineers.

### INTERESTS OF SUCCESSFUL DOCTORS, LAWYERS AND ENGINEERS

The present study uses a modified form of the Carnegie Institute of Technology Interest Analysis Blank, varies the statistical treatment of responses, and evaluates the returns secured from selected groups of successful doctors, engineers, and lawyers.

The study seeks first, to find, if present, characteristic differences between the expressed attitudes from the members of different professions; second, to express these differences in a numerical score; third, to determine if differences so found and statistically described are valid earmarks of these professions as represented by new lists of practitioners; fourth, to determine if these same differences can be traced down through the professional training period to students who are or will be making their choice of a profession; to determine the reliability of the method of evaluation when applied to different groups; and, finally, to seek by means of statistical procedure further possible significance for these expressed attitudes.

### SCALES FOR MEASURING INTERESTS

The modified Interest Report Blank consists of three pages of items toward each of which the subject indicates his attitude as one of liking, indifference, or dislike. The items include 84 occupations, 78 types of people, 34 sports and amusements, 6 kinds of pets, 13 representative kinds of reading, 23 miscellaneous activities, and 25 school subjects. Suitable instructions are given at various points in the blank. It is practically self-administering except to subjects below high school age (where the usefulness of the blank is yet to be determined). There is no time limit, but subjects are urged to work rapidly in order that their responses may be rationalized to the least extent possible. Adults require about 20 to 30 minutes to fill out the blank.

The primary or criterion group of subjects consisted of 105 carefully selected successful professional people, 34 doctors, 37 engineers, and 34 lawyers. The representativeness of the responses of these relatively small groups is verified by the remarkable conformity in responses of new groups of individuals from the same professional classifications.

The distribution of responses for each item was tabulated separately for each profession. The professional evaluation was made by comparing the proportion of responses coming from one profession with the proportion coming from the non-members of that profession. If a response was given by a larger proportion of doctors than of non-medical professionals that response was given a positive medical item-score. The relative size of the weighted scores assigned to each response was determined by means of a modification of the technique of obtaining multiple regression equation coefficients. This method of obtaining close approximations to the best values was worked out by Dr. Truman L. Kelley. The weighted score $b$ is obtained from

the formula $b = \frac{\phi}{(1-\phi^2)\sigma}$, where $\phi$ is the coefficient of correlation for the four-fold table, the formula being

$$\phi = \frac{ad - bc}{\sqrt{(a+c)(b+d)(a+b)(c+d)}}$$

and where the four-fold table contains the number of responses given to an item by a group of members of a profession on one row and by non-members of that profession on the other row. The columns of the table are a dichotomization of the L-I-D series of possible responses.

The responses to each of the 263 items were evaluated for each of the three professions. Three scoring schemes which have been called Medical, Engineering, and Legal Professional Interest Scales were thus produced.

The Medical Interest Scale is made up of item-scores ranging from 0 to 13, with a total possible range of 920 points, each set of item-scores including positive and negative values. The significantly weighted items may be characterized as indicating a personal attitude on the part of doctors in which they express an obligation to serve others, perhaps suitably called social service.

On the basis of this Medical Interest Scale, scoring of the blanks of the criterion groups resulted in scores for doctors from 32 to 170, and for non-medical men from −183 to 46. Only one non-medical individual received a score as high as the lowest medical score. The statistical method was successful in clearly separating the medical men from the non-medical.

Similarly the Engineering Interest Scale makes use of item-scores from 0 to 13 but with a wider range of possible scores, 1214. The typical expressed attitude of engineers has been characterized as one of *relative* dislike for social, cultural and abstract intellectual situations, and includes a comparatively narrow set of positive interests in situations involving the use of mechanical principles and manipulations.

Distributions of the scores of the criterion groups on the engineering scale again show that the statistical technique has been successful in identifying characteristic differences and in separating the engineers from the non-engineers. The engineers receive scores from 50 to 367. With a critical line drawn at 100 only one engineer's score is found below and but one non-engineer's above.

The significant responses on the Legal Interest Scale suggest a liking for situations involving social contacts, verbal activity and its direct influence upon other people, coupled with a comparative dislike for the use of mechanical tools and principles. The scores range from 0 to 14 per item, and provide a total range of 1226 points. When scored on this scale the criterion groups are spread out with comparatively little overlapping between legal and non-legal groups. One lawyer receives a score below, three non-lawyers receive scores higher than 50.

Judging from the results of the statistical treatment, the criterion groups show identifiable characteristic differences in response to the test situation, and the scoring technique

has been successful in objectively separating each professional group from the others.

### VALIDATING THE SCALES

To test the validity and representativeness of the characteristic responses identified in the criterion groups data were obtained from four additional general groups (1) a new group of professional practitioners, (2) graduate and upper division university students engaged in the specific training for these professions, (3) lower division university students and high school senior students interested in future professions, but not yet engaged in direct training for specific fields, and (4) control subjects at each of the above educational stages. These new groups total 835 individuals, 408 in the control groups and 427 in the professionally inclined groups.

TABLE 1

| | MEAN MEDICAL INTEREST SCORE | STANDARD DEVIATION OF SCORES |
|---|---|---|
| 64 doctors | 49.7 | 42.8 |
| 37 engineers | −47.1 | 51.6 |
| 45 lawyers | −38.6 | 49.2 |
| 27 miscellaneous | −33.5 | 69.2 |

Scored on the Medical Interest Scale the reports of the new professional subjects give the averages and spreads in score shown in table 1. That the non-medical groups are clearly differentiated from the medical by the scores is demonstrated by the fact that the differences between the non-medical and the medical mean scores are 9.6, 11.9, and 5.8 times the standard deviations of the respective differences. The coefficient of reliability of the method of determining medical scores for this group is 0.775 ± 0.034. The standard error of estimate of the scores is 29.3. Scores 30 points above the critical level begin to have individual classificatory significance.

TABLE 2

| | MEAN ENGINEERING INTEREST SCORE | STANDARD DEVIATION OF SCORES |
|---|---|---|
| 37 engineers | 125.4 | 80.6 |
| 64 doctors | −10.4 | 79.9 |
| 45 lawyers | −41.5 | 88.0 |
| 27 miscellaneous | 35.8 | 121.7 |

TABLE 3

| | MEAN LEGAL INTEREST SCORE | STANDARD DEVIATION OF SCORES |
|---|---|---|
| 45 lawyers | 108.9 | 81.1 |
| 64 doctors | −22.6 | 94.2 |
| 37 engineers | −92.0 | 82.5 |
| 27 miscellaneous | −8.5 | 101.2 |

The Engineering Interest Scale scoring produced results comparable with those just described for the Medical Scale. The mean scores and standard deviations of the scores are

given in table 2. The differences between the non-engineering means and the engineers' mean score are 8.2, 9.0, and 3.3 times the standard deviations of the differences. The reliability of the method and scale is 0.802 ±0.030, standard error of estimate of single scores 43.3.

Table 3 gives the corresponding data from the Legal Interest scoring. The differences between non-legal group means and the mean score of the lawyers are 7.5, 10.7, and 5.0 times the standard deviations of the differences. The reliability of the legal scores is 0.905 ± 0.014, standard error of estimate of scores 33.9.

The characteristic differences statistically identified and evaluated in the criterion data are found to exist among new groups from the same professions to such an extent that the present scoring scheme definitely distinguishes between the groups. Doctors tend to receive positive medical interest scores, non-medical men tend to receive distinctly lower scores, predominantly negative. Similar results were obtained from the legal and engineering scales.

The groups of university students who have been rated according to their responses give data similar to those from the professional men. The mean scores and standard deviations of scores by groups are shown in table 4.

TABLE 4

| | MEDICAL | | ENGINEERING | | LEGAL | |
|---|---|---|---|---|---|---|
| | Mean | $\sigma$ | Mean | $\sigma$ | Mean | $\sigma$ |
| Graduate Medical Students | 49.1 | 44.3 | −34.0 | 82.7 | −9.5 | 91.7 |
| Upper Division Pre-Medical Students | 61.1 | 40.2 | −34.0 | 83.1 | −17.7 | 87.7 |
| Lower Division Medical Preference | 53.3 | 43.7 | −32.3 | 40.6 | 3.8 | 55.2 |
| Graduate Engineering Students | −29.5 | 48.0 | 116.1 | 113.4 | −77.0 | 111.9 |
| Upper Division Pre-Engineering Students | −62.7 | 52.7 | 141.8 | 56.7 | −74.2 | 72.5 |
| Lower Division Engineering Preference | −51.1 | 40.1 | 154.7 | 70.9 | −119.4 | 87.6 |
| Graduate Law Students | −47.4 | 46.9 | −73.4 | 80.0 | 130.4 | 83.8 |
| Upper Division Pre-Legal Students | −56.2 | 50.1 | −55.4 | 82.0 | 110.6 | 74.7 |
| Lower Division Legal Preference | −53.0 | 45.2 | −67.4 | 65.0 | 125.1 | 67.6 |
| Medical Students and Doctors | 51.1 | 43.4 | −25.9 | 81.6 | −14.7 | 91.3 |
| Engineering Students and Engineers | −46.4 | 69.6 | 130.1 | 85.9 | −88.3 | 90.6 |
| Law Students and Lawyers | −53.3 | 48.3 | −59.4 | 82.2 | 119.2 | 81.6 |

The last three classifications in the above table include all students and professional men who were tested after the data from the criterion groups were segregated. The latter are not included in the tabulation since their scores would have forced a statistical differentiation.

As listed in the table, all groups with medical professional preference receive positive medical interest mean scores. Non-medical groups receive negative averages. Legally inclined

individuals receive positive average legal interest scores; all but one of the non-legally inclined groups are given negative legal average scores. Similarly the central tendencies of the engineering scores of the engineer and pre-engineering groups are positive, of all other groups negative. The differences between the mean

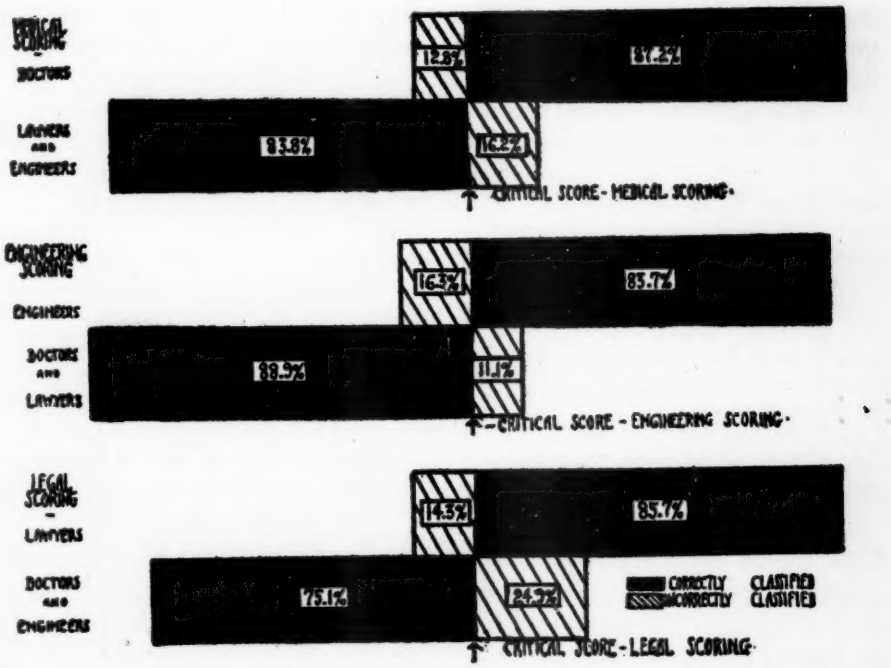


FIG. 1. TEST CLASSIFICATION COMPARED WITH CHOSEN PROFESSION

score of any professional group and the corresponding mean scores of non-members of that profession are in no case less than 4.5 times the standard error of the difference between the mean scores. These differences range from 4.5 up to 11.8 times their respective standard errors.

That the group standing is not directly dependent upon the amount of training in the profession is evident from the fact that there is no consistent progression in size of interest scores as one follows the training scale from lower division university students up through the graduate student stage and into the active profession. The basis for the type of interest response is laid down in the make-up of the individuals and by their experiences previous to reaching university professional training. This fact is here established for groups; whether true for individuals remains to be investigated in later research.

A measure of the individual classificatory efficiency of the scales (a further index of validity) is available from a division of the data secured

from the above scorings into professional and non-professional categories by means of critical lines. Use of a critical level at score zero on the medical scale correctly classifies 87.2 per cent of doctors and medical students, 83.8 per cent of non-medical individuals. The engineering scores, with a critical level at 50, correctly place 83.7 per cent of engineering preferring individuals and 88.9 per cent of the non-engineering. The legal scale properly identifies 85.7 per cent of lawyers and pre-law students. The classification of non-legal individuals is not as efficient, 75.1 per cent being correctly classified, which leads us to believe that our legal interest is not strictly legal, but of a more general nature shared by nearly all lawyers and by several other occupational classes to an extent appreciably larger than is the case with medical and engineering interest. Figure 1 presents these facts graphically.

The reliability of the method and scales when applied to various of the significant groups is listed in table 5. The coefficients quoted were obtained by calculating the coefficient of correlation between the scores obtained by using only the odd-numbered items on the blanks and the scores from the even-numbered items and then applying the Brown-Spearman correction formula. The probable errors were obtained by use of the formula derived by Shen.

On the basis of the returns from the new practising professional men there has been worked out a table of professional ratings (table 6) wherein equivalent scores on the three different scales have been assigned the same rating. For instance, the three critical level scores receive professional ratings of zero. The average medical score of doctors is rated +25, the average engineering score of engineers +25 and the average legal score of lawyers +25. The intervening scores have been assigned their appropriate ratings according to their scale position with reference to mean and critical level. The same score intervals were used in assigning the ratings above the means. Since the positive ratings were based upon the distribution of the scores of members of the professions while the negative were based upon that of the scores of the non-members, and since the scores of non-members tended to have wider ranges of dispersion the intervals per unit of rating below zero are larger than is the case for positive ratings.

TABLE 5

*Coefficients of reliability*

| GROUPS | LEGAL SCALE | ENGINEERING | MEDICAL |
|---|---|---|---|
| Experienced Men | 0.905 ± 0.014 | 0.802 ± 0.030 | 0.775 ± 0.034 |
| Graduate Students | 0.846 ± 0.015 | 0.831 ± 0.016 | 0.778 ± 0.022 |
| Upper Division University Students | 0.813 ± 0.019 | 0.786 ± 0.026 | 0.794 ± 0.021 |
| Lower Division University Students | 0.782 ± 0.025 | 0.661 ± 0.039 | 0.685 ± 0.036 |
| High School Senior Boys | 0.842 ± 0.026 | 0.844 ± 0.026 | 0.697 ± 0.051 |

Ratings of the responses of a comparatively small group of students who were subjectively undecided as to their primary professional preference assigned significant classifications with one or another of the three professions to 53 per cent of the group.

TABLE 6

*Professional interest ratings*

| PROFESSIONAL RATING | MEDICAL RAW SCORES | ENGINEERING RAW SCORES | LEGAL RAW SCORES |
|---|---|---|---|
| 75 | 145 to 154 | 282 to 297 | 258 to 273 |
| 70 | 135 to 144 | 266 to 281 | 242 to 257 |
| 65 | 125 to 134 | 250 to 265 | 226 to 241 |
| 60 | 115 to 124 | 234 to 249 | 210 to 225 |
| 55 | 105 to 114 | 218 to 233 | 194 to 209 |
| 50 | 95 to 104 | 202 to 217 | 178 to 193 |
| 45 | 85 to 94 | 186 to 201 | 162 to 177 |
| 40 | 75 to 84 | 170 to 185 | 146 to 161 |
| 35 | 65 to 74 | 154 to 169 | 130 to 145 |
| 30 | 55 to 64 | 138 to 153 | 114 to 129 |
| 25 | 45 to 54 | 122 to 137 | 98 to 113 |
| 20 | 35 to 44 | 106 to 121 | 82 to 97 |
| 15 | 25 to 34 | 90 to 105 | 66 to 81 |
| 10 | 15 to 24 | 74 to 89 | 50 to 65 |
| 5 | 5 to 14 | 58 to 73 | 34 to 49 |
| 0 | −8 to 4 | 41 to 57 | 13 to 33 |
| −5 | −23 to −9 | 21 to 40 | −12 to 12 |
| −10 | −38 to −24 | 1 to 20 | −37 to −14 |
| −15 | −53 to −39 | −19 to 0 | −62 to −38 |
| −20 | −68 to −54 | −39 to −20 | −87 to −63 |
| −25 | −83 to −69 | −59 to −40 | −112 to −88 |
| −30 | −98 to −84 | −79 to −60 | −137 to −113 |
| −35 | −113 to −99 | −99 to −80 | −162 to −138 |
| −40 | −128 to −114 | −119 to −100 | −187 to −163 |
| −45 | −143 to −129 | −139 to −120 | −212 to −188 |
| −50 | −158 to −144 | −159 to −140 | −237 to −213 |
| −55 | −173 to −159 | −179 to −160 | −262 to −238 |
| −60 | −188 to −174 | −199 to −180 | −287 to −263 |
| −65 | −203 to −189 | −219 to −200 | −312 to −288 |
| −70 | −218 to −204 | −239 to −220 | −337 to −313 |
| −75 | −233 to −219 | −259 to −240 | −362 to −338 |
| Mean Score..... | 49.7 | 125.4 | 108.9 |
| Critical Score..... | 0 | 50 | 25 |

Similarly definite classification of interests was possible for 70 per cent of a senior class of high school pupils

of a social level of the professional type.

Correlations between interest scores and other measurable traits were calculated for the university student groups. The engineering interest rating alone has significant positive relation with age, and this independent of the amount of engineering training acquired. Significant relations with intelligence test scores are lacking; a slight positive relation with Thorndike test scores was noted in the case of the respective interest ratings of law and engineering students.

Relative degrees of success in university achievement, as measured by average grade in legal and medical courses, are not predicted, only the categorical classification being significant.

A raw correlation coefficient 0.335 $\pm$ 0.109 is found when engineering interest scores and university grades in engineering subjects are compared. With the factor of intelligence partialed out a coefficient of 0.292 remains. Corrected for attenuation it becomes 0.453. Engineering interest and intelligence test scores combined by means of multiple correlation technique correlate 0.530 with university grades in engineering courses.

On the basis of expressed attitudes obtained by means of a test situation in which is used the so-called Interest Report Blank there is now available an objective professional classification of individuals which has proved its classificatory efficiency to be between 80 and 90 per cent, and the reliability of its scores to be from 0.77 to 0.90, according to the professional scale used and the educational level of the group considered.

*(Manuscript received January 19, 1926.)*

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# Selection of Promotion Salesmen

By Max Freyd, *Personnel Research Federation*

*In this study Dr. Freyd has aimed to avoid tests which had failed in the past to prove their usefulness in the selection of salesmen, and to introduce some newer tests which might measure such determinants of success as output of energy, aggressiveness, lack of excessive shyness or self-consciousness, and the like. Twenty-one tests were tried, of which eight proved useful in differentiating the successful from the unsuccessful stock salesmen in each of the two cities where they were employed.*

Store salesmen

THIS investigation of sales ability was made in 1922 in a corporation which had opened offices in New York and Philadelphia to gain capital for expansion through the sale of stock.

In each of the two cities a force of salesmen was maintained, in charge of a sales manager and a number of assistants. Applicants for these sales positions were obtained by inserting advertisements in the metropolitan newspapers. At the offices of the corporation they were interviewed by the assistant sales managers. Those who showed promise of sales ability and seemed to meet the company's ideals were taken on for a trial period. They were given a series of lectures by salesmen and prominent men who were financially interested in the company. Every morning before leaving for their outside work they were given a talk by the assistant sales managers.

These men had no duties other than selling the stock of the corporation. Payment was entirely on a commission basis. Some who showed exceptional ability were transferred to executive positions.

Although the sales campaign was a success, the turnover among the salesmen was extremely high. The management felt that many men were being lost who would later have proved valuable to the company.

Some means of detecting sales aptitude among applicants was needed in order that the best could be encouraged to remain with the firm. For this purpose a series of tests was constructed and tried out. The tests were chosen on the theory that they measured abilities necessary to success in this occupation. Emphasis was placed on tests of personality.

To validate the predictive value of these tests, they were given to a number of the company's salesmen and the scores were compared with the sales ability of the men.

The sales record in itself was found to be an erratic measure of sales

ability because some of the men ran up high records by selling only to relatives, whereas others of considerable past experience or apparent aptitude lacked temporarily a clientele. The assistant sales managers were able to detect the cases where the sales record was not a valid criterion and make the necessary adjustments. The measure of vocational success was therefore partly the sales record and partly the judgment of the assistant sales managers.

On this basis sixteen salesmen in the New York office and fifteen in the Philadelphia office were chosen for testing. They represented three well defined grades of sales ability: successful men, average men, and failures.

Some of the tests were given to the men as a group whereas others had to be given as individual tests.

In the following discussion the tests are divided into two classes: those which had no validity, and those whose scores agreed with the degree of success of the salesmen.

### TESTS WHICH HAD NO VALIDITY

Some of these tests proved significant in only one of the two cities. The rest proved to be of no value in either city, or proved to be of no value in one city and were not tried in the other.

(a) Each salesman was asked to write the words "United States" first right-handed and then left-handed. The score was the ratio of the length of the phrase left-handed to right-handed.

(b) Each salesman was asked to sign his name on a pad of paper which had been interleaved with sheets of carbon paper. The score was in terms of the number of sheets of paper on which the man's signature was at all visible. There was some tendency for the better salesmen to exert more pressure on the paper, but the tendency was not pronounced enough for prognosis.

(c) Each salesman was asked to copy a column of figures which were read to him by the examiner. The figures were so arranged as to suggest a slope toward the right when copied. The slope of the columns bore no relationship to sales ability.

Example: 64281
42813
28136
81365

(d) Each salesman was asked to shut his eyes and name words at random as fast as he could. He was timed for forty words. He was then asked to repeat the process while staring at the examiner, and was again timed for forty words. The score was the ratio of the time for the second trial to that for the first.

(e) Two poker chips were placed before the salesman, and he was asked to move them back and forth until he thought there was room enough between them for two more chips in line. When this adjustment was completed suggestions were given, such as "Isn't that too far?" or "Isn't that too close?" The score was the number of these suggestions which resulted in a movement of readjustment. Neither this score nor the actual distance between the chips at the last adjustment bore any relation to sales ability.

(f) Each salesman was observed during the examination for the tendency to cross his legs. The New York men gave evidence that the tendency to cross legs was more marked among poor salesmen than good ones, but the data from the Philadelphia group did not substantiate this conclusion.

(g) Each salesman was asked to write down the letters *a*, *e*, *o*, *b*, *m*, and *t*. He was then told to form as many English words from these letters as he could within a period of five minutes, using no letter more than once in a word, and using no letters but these six (1).

(h) A test of ability to judge expression was constructed by selecting from Rudolph's Atlas (2) twelve pictures representing mental states which might be encountered in a sales interview, and pairing each picture with a sentence expressing the corresponding thought. The sentences were disarranged, and the salesman was asked to pair each picture with the appropriate sentence.

(i) The salesman's memory span for digits was determined while he gazed at a blank wall. He was required to repeat after the examiner series of digits of varying length. His memory span for digits was the longest series which he could repeat correctly. This procedure was repeated while the salesman stared the examiner in the eye. The ratio of the latter span to the former was determined. None of these measures showed any promise.

(j) A series of eighteen words was read to the salesman one at a time. After each of them he responded as quickly as he could with the first word which came to mind. Many of the stimulus words referred to traits which were thought necessary to successful salesmanship. The quickness of response for each word was determined. Both the word responses given and the time taken to reply were studied for possible significance. The total time for the whole list was of some value with the Philadelphia group. There was a tendency for the successes to be quicker in response than the failures. The results with the New York men did not substantiate this.

(k) The group form of the Downey Will-Temperament test used at Carnegie Institute of Technology was given to each salesman (3). No parts proved significant except 3 and 9.

(l) Another group test consisted of the Kent-Rosanoff list of stimulus words printed in a series with a blank space opposite each word in which the salesman wrote his response word. The test was administered by giving a starting signal and allowing the salesmen to write their responses as fast as they could for four minutes. This test is reproduced at the end of this article as Series 12 (3). It did not prove significant when scored according to the number of contrast responses.

(m) Each salesman was asked to fill out an experience record and a vocational interest analysis, and to answer a number of miscellaneous questions on motives and beliefs. In the New York group the successful men averaged greater in age, height, weight, and number of dependants than the failures, but these results did not hold good for the Phila-

delphia group. Some items in the vocational interest analysis were significant, but they were too few to warrant their use in selection. Five of the miscellaneous questions proved significant and will be discussed later.

TESTS WHICH HAD VALIDITY

The following tests proved equally valid for the sales groups in both cities. The records for some of the tests are incomplete.

(1) *Copying Five Inch Line from Memory.* A five-inch line at the top of a sheet of letter size paper was shown for about five seconds, and then withdrawn. The salesman was given two sheets of white letter-size paper and was asked to reproduce the line twice, starting near the left-hand margin on one sheet and starting near the right-hand margin on the other sheet. The theory behind this test is that the successful salesman is an impulsive, expansive sort of person, and that this tendency reveals itself in minor movements as well as in the person's total reactions. Theoretically the impulsive person will exaggerate the length of the line when drawing it from left to right, that is, away from himself, and will underestimate the line when drawing it toward himself. Credit was given if the line was drawn from left to right was more than five inches long; or if the line as drawn from right to left was less then five inches long. (The directions for the test are given at the end of this paper.) Results are given below for both cities combined. (See figure 1.)

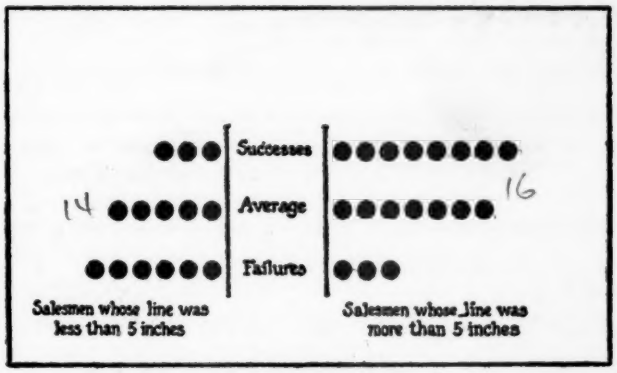


FIG. 1. ABILITY OF THREE GROUPS OF PROMOTION SALESMEN TO COPY A FIVE-INCH LINE FROM MEMORY, DRAWING FROM LEFT TO RIGHT

*Length of line drawn left to right*

| | *Less than 5 inches* | *More than 5 inches* |
|---|---|---|
| Successes | 3 | 8 |
| Average | 5 | 7 |
| Failures | 6 | 3 |

*Length of line drawn right to left*

| | *More than 5 inches* | *Less than 5 inches* |
|---|---|---|
| Successes | 5 | 6 |
| Average | 9 | 3 |
| Failures | 6 | 3 |

(2) *Mental Arithmetic (Moore and Gilliland Aggressiveness Test).* Each salesman was asked to do a number of problems in mental arithmetic while staring the examiner in the

eye (4). The score in this test was the total number of times the salesman took his eyes off the examiner's while solving the problems. Moore and Gilliland found that a man's

*Number of times eyes were taken off examiner's*

| | *2 or more* | *0 or 1* |
|---|---|---|
| Successes..... | 0 | 11 |
| Average..... | 8 | 4 |
| Failures..... | 9 | 0 |

($r = +0.72$)

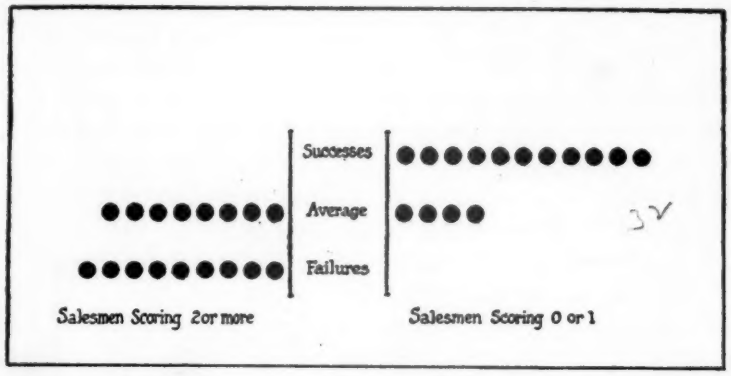


FIG. 2. SCORES OF THREE GROUPS OF PROMOTION SALESMEN IN MENTAL ARITHMETIC (MOORE AND GILLILAND AGGRESSIVENESS TEST)

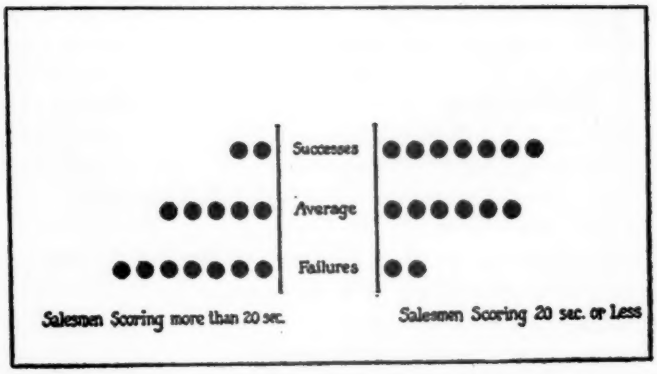


FIG. 3. SCORES OF THREE GROUPS OF PROMOTION SALESMEN IN OBJECTIONS TO PURCHASE TEST

performance in a test of this sort was closely related to his aggressiveness. Directions for this test are given at the end of this paper. The results are given below for both cities combined. (See figure 2.)

(3) *Objections to Purchase Test.* The salesman was instructed to imagine he was selling an office appliance and that his prospect was raising certain objections to the purchase of his article. These objections were

mentioned one at a time by the examiner, and after each of them the salesman was required to give his come-back as quickly as possible. His time was recorded for each come-back, and his score was the total time for the eight objections. This test is given in full at the end of this paper. Results are given below for both cities combined. (See figure 3.)

*Total time for answers to objections*

| | More than 20 seconds | 20 seconds or less |
|---|---|---|
| Successes | 2 | 7 |
| Average | 5 | 6 |
| Failures | 7 | 2 |

($r$ = +0.41)

*Score in Business Information*

| | 54 or less | 55 or more |
|---|---|---|
| Successes | 3 | 7 |
| Average | 10 | 2 |
| Failures | 6 | 1 |

($r$ = +0.46)

(5) *Parts 3 and 9 of the Will-Temperament Test.* The score for each of these two parts was the number of pairs of traits checked in the time allowed. Speed in checking these traits is theoretically an indication of absence of self-consciousness, i.e., maintenance of calm and speed of decision in the face of material which has reference to one's own personality. In this study the total score for both parts was used. (The tests are given at the end of this article.) Results for both cities are given below. (See figure 5.)

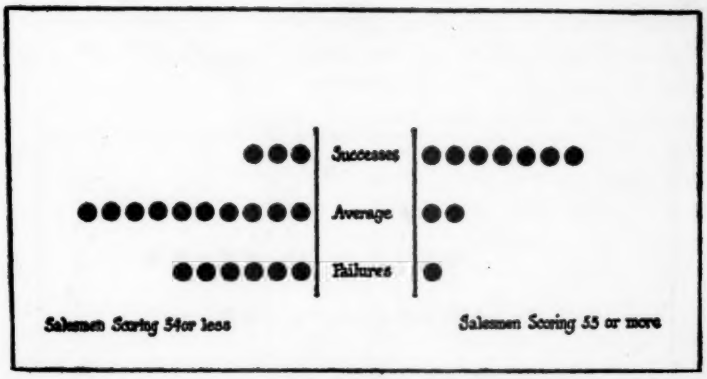


FIG. 4. SCORES OF THREE GROUPS OF PROMOTION SALESMEN IN BUSINESS INFORMATION TEST

(4) *Business Information Test.* The Carnegie Institute Test of Business Information proved valuable. This test is in the form of an omnibus test of intelligence but the content is all with reference to commerce and industry. Extracts from this test are included here. A limit of 15 minutes was used, excluding time for learning the directions. Results are given below for both cities combined. (See also figure 4.)

*Total scores in Parts 3 and 9*

| | 53 or less | 54 or more |
|---|---|---|
| Successes | 1 | 8 |
| Average | 11 | 1 |
| Failures | 5 | 2 |

($r$ = +0.49)

(6) *Series 12 (Kent-Rosanoff).* This test when scored according to the

number of responses within the time limit, gave the results shown below. This test as thus scored measures the salesman's speed of association. The test itself is given at the end of this article. (See figure 6.)

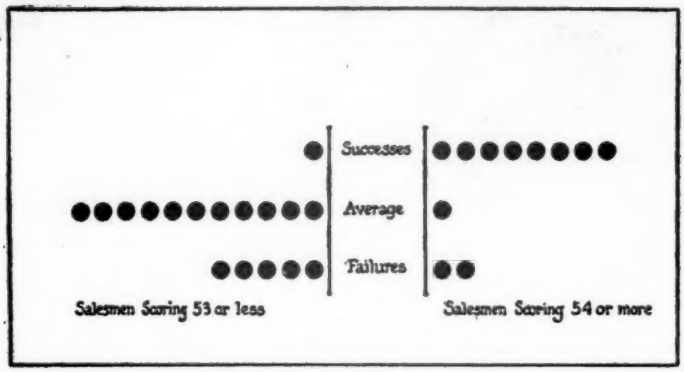


FIG. 5. SCORES OF THREE GROUPS OF PROMOTION SALESMEN IN PARTS 3 AND 9 OF THE WILL-TEMPERAMENT TEST

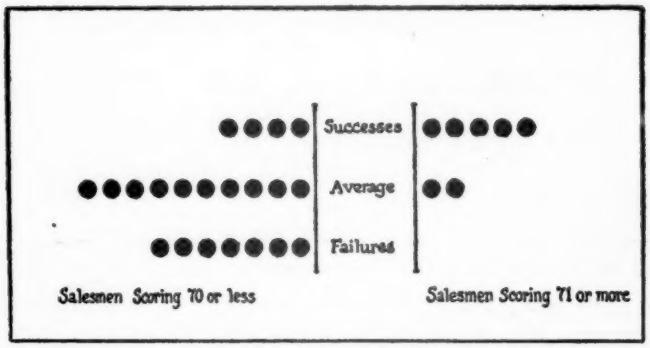


FIG. 6. SCORES OF THREE GROUPS OF PROMOTION SALESMEN IN SERIES 12 (KENT-ROSANOFF)

*Scores in Series 12*

| | *70 or less* | *71 or more* |
|---|---|---|
| Successes..... | 4 | 5 |
| Average..... | 10 | 2 |
| Failures..... | 7 | 0 |

($r$ = +0.30)

(7) *Impulsive Lines in Signature.* Each man's signature was observed for the tendency to include impulsive lines, flourishes, or unnecessary extensions of lines. This is theoretically an evidence of the same tendency that test 1 aims to measure. Signatures were judged by comparison with signatures chosen as standards by the writer. Results from both cities combined are as follows.

*Does signature show impulsive lines?*

| | *No* | *Yes* |
|---|---|---|
| Successes..... | 3 | 8 |
| Average..... | 6 | 6 |
| Failures..... | 7 | 2 |

(8) Results with questions which

showed differentiating value are given below.

*Do you work better on a sunshiny day or a rainy day?*

| | *Rainy* | *Sunshiny* | *No difference* |
|---|---|---|---|
| Successes.... | 0 | 4 | 7 |
| Average..... | 4 | 3 | 5 |
| Failures..... | 1 | 6 | 2 |

*Do you work better in summer or winter?*

| | *Winter* | *Summer* | *No difference* |
|---|---|---|---|
| Successes..... | 4 | 1 | 6 |
| Average..... | 6 | 2 | 4 |
| Failures..... | 7 | 1 | 1 |

*Can you do good work while people are looking on?*

| | *No* | *No difference* | *Yes* |
|---|---|---|---|
| Successes..... | 1 | 1 | 8 |
| Average..... | 2 | 0 | 10 |
| Failures..... | 2 | 2 | 3 |

*What income do you expect to derive from your occupation at the age of 55?*

| | *Less than $20,000* | *$20,000 or more* |
|---|---|---|
| Successes..... | 1 | 9 |
| Average..... | 6 | 6 |
| Failures..... | 5 | 2 |

*What mental traits do you have which might detract from your sales efficiency?*

*Traits named by successes:*

Too quick
Too much pride
Too enthusiastic
Too talkative
Too aggressive

*Traits named by failures*

Lack of perseverance
Lack of aggressiveness
Lack of nerve
Plug is pulled too easily
Laziness
Self-consciousness
Sensitiveness
Fear
Appeals to reason too much
Too earnest

*Does the salesman mention one or more of the traits named by failures?*

| | *Yes* | *No* |
|---|---|---|
| Successes..... | 1 | 10 |
| Average..... | 9 | 3 |
| Failures..... | 9 | 0 |

TOTAL SCORE

The next step was to obtain a total score which would combine the predictive value of the different tests. No involved statistical method of obtaining a total score was used owing to the small number of subjects. The method of critical sections was used. No distinctions were made between scores within a critical section. The final weight given to a critical section was based on the writer's judgment of the relative reliability and validity of the test.

The weights assigned to each critical section are given at the end of this article. This table is self-explanatory. Each man is given each of the tests and his scores are recorded. If the score in Business Information is 55 or more, he receives credit of 7 for that performance. If his score is less than 55 he receives 0. Each man's total score for the series of tests is the sum of the weights which he has earned by his scores in the separate tests.

Figure 7 shows the distribution of

total scores for the 31 men on whom the tests were evaluated. These total scores are subject to error inasmuch as some of the men did not take all of the tests. It is apparent that the total score has considerable differentiating value. All of the successful men obtain scores of more than 40. No failures score this high. At the lower extreme $\frac{7}{8}$ of the failures and only $\frac{4}{12}$ of the average men score 12 or less. The correlation of total score with vocational success is +0.84.

(*Manuscript received April 15, 1926.*)

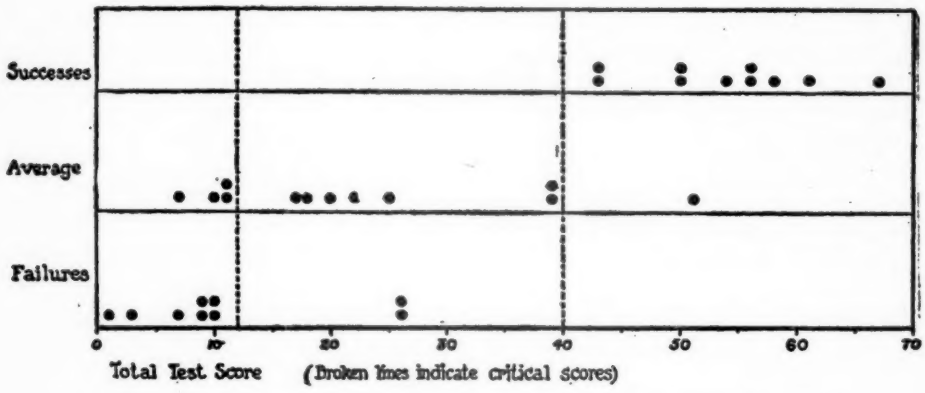


FIG. 7. TOTAL TEST SCORES OF THREE GROUPS OF PROMOTION SALESMEN

## REFERENCES

(1) WHIPPLE, G. M.: Manual of Mental and Physical Tests. 2 vols. 3rd ed. Baltimore: Warwick and York, 1914.

(2) RUDOLPH, H.: Der Ausdruck der Gemütsbewegungen des Menschen. Text and Atlas. Dresden: G. Kühtmann, 1903.

(3) FREYD, M.: The personalities of the socially and the mechanically inclined. Psychological Monographs, No. 151, 1924.

(4) MOORE, H. T., AND GILLILAND, A. R.: The measurement of aggressiveness. Journal of Applied Psychology, 1921, vol. 5, pp. 97–118.

## TEST 1

### COPYING FIVE-INCH LINE

Show a five-inch line to the applicant for about 5 seconds, telling him to observe its length. Then hide the line, and give him a sheet of letter size paper telling him to draw a line of equal length, starting at the *left* (not exactly at the margin).

Tell him to turn over the sheet he has just drawn on, and show him the line again for about 5 seconds. Then hide the line, and tell him again to draw a line of equal length, starting at the *right* of the sheet.

Indicate by a check (on sheet of paper), which end of the line he started at in each case.

## TEST 2

### MENTAL ARITHMETIC (MOORE AND GILLILAND AGGRESSIVENESS TEST)

Read the following directions to the applicant.

"I want you to do some mental arithmetic. Start in with the number 10, add 1 to it, then add 2 to that, 3 to that, and so forth. Do it out loud, as follows: 10 and 1 are 11, 11 and 2 are 13, 13 and 3 are 16, 16 and 4 are 20, and so on. Continue this until you have added 9, then stop." (Make sure that he understands the directions.)

"Now while you do this, look me in the eye. Don't take your eyes off mine until you are through. Your score will be in terms of your accuracy and your ability to keep your eyes on mine. Speed does not count."

Keep your face fairly close to the subject's, so that you will be able to tell if he takes his eyes off yours.

Record the number of times he takes his eyes off yours..... ——— times

"Now I want you to do the same thing again, starting with 20 this time. Remember not to take your eyes off mine."..... ——— times

"Now try it again, starting with 30."..... ——— times

"Now try it again, starting with 40."..... ——— times

"Now try it again, starting with 50. This will be the last trial."..... ——— times

*Total*..... ——— times

## TEST 3

### OBJECTIONS TO PURCHASE TEST

Read the following directions to the applicant.

"Imagine that you are a specialty salesman for a highgrade office appliance. Imagine also that I am a business man, that you have investigated my circumstances, and that you are convinced I ought to buy your appliance. You are trying to sell me the article. I will raise some objections to buying, supposedly in the course of your sales presentation, and after each objection I want you to give me your answer or come-back, *as quickly as you can*. Do not make a sales talk."

Measure and record the time of response for each comeback. Start the watch the instant you have finished reading the objection, and stop it the instant the subject starts confidently on his come-back. Score 20 seconds for each response which is irrelevant or obviously not an answer to the objection.

1. I am very busy now. Come again tomorrow..... ——— seconds
2. Your president, Mr. X, once put over a shady deal on me, and I won't trust his company..... ——— seconds
3. I can't see where I have any use for that thing..... ——— seconds
4. I can buy a second-hand one much cheaper..... ——— seconds
5. We have one something like it made by the Blank Co. which has been giving us good service for the last ten years..... ——— seconds
6. Of course you see all the good points of your own product, and overlook the fact that other companies also put out good products.... ——— seconds
7. Your company is making too much profit on that article. It doesn't look as if it is worth half of what you ask for it..... ——— seconds
8. I will have to consult my partners before any such purchases..... ——— seconds

*Total time*..... ——— seconds

TEST 4

BUSINESS INFORMATION TEST

*Directions*

**Inside this booklet you will find several different things to do. Samples of all the different kinds are given below. Read the samples and directions carefully.**

(a) Problems in Business Arithmetic.

Examples:

If your salary is $150 per month and you save 10 per cent of it each month, how much will you save in a year? Answer ($180)

Solve the problems, using the margins of the page for figuring, and write the answer to each problem in the blank space following **answer**, as in the example.

(b) Items of information.

Examples:

(1) The center of the automobile industry in the United States is **Cleveland Detroit Indianapolis Buffalo**

In items like this the thing to do is to decide which of the four words or expressions in **black type** makes the sentence a true statement of fact, and underline it, thus:

The center of the automobile industry in the United States is **Cleveland <u>Detroit</u> Indianapolis Buffalo**

Other examples, correctly marked, follow:

(2) National business conditions are predicted by **rainfall <u>bank clearings</u> college graduates population**

(3) Henry Ford's chief success was won in **banking shipping engineering <u>automobiles.</u>**

(4) The Federal Income Tax Law provides for personal exemption of

.....$3500 if married and living with wife or husband.

.....All gifts made in consideration of service rendered.

..x...$1000 if single.

**Example No. 4**, you will notice, is different. In items of this sort, instead of underlining, you are to place a cross (x) just before the phrase which makes the whole sentence a statement of fact. Example No. 4 is correctly marked.

(c) Analogies—relationships between ideas.

Examples:

(1) Proctor and Gamble—soaps::H. J. Heinz—**revolvers cleanser <u>pickles</u> automobiles**

Here the thing to do is to underline the one word in black type which is related to H. J. Heinz in the same way that "soap" is related to Proctor and Gamble. The word to underline is **pickles**, since the H. J. Heinz Co. is famous for its pickles, just as Proctor and Gamble Co. is known everywhere as a manufacturer of soap.

A second example, correctly marked, follows:

(2) wholesaler—retailer:: retailer—**dealer salesman <u>consumer</u> manufacturer**

(d) Word Meanings.

Examples:

(1) salary—compensation **same opposite**

The words "salary" and "compensation" mean the same thing, therefore the thing to do is to underline **same,** thus:

salary—compensation **same** **opposite**

A second example, correctly marked, follows:

(2) produce—consume **same** **opposite**

(e) True and False Statements.

Examples:

(1) Sears-Roebuck & Co. deals exclusively in chemicals. **true** **false** This statement is untrue. Therefore the thing to do is to underline **false,** thus:
Sears Roebuck & Company deals exclusively in chemicals. **true** **false**

A second example, correctly marked, follows:

(2) Most people prefer to keep their homes free from mortgages. **true** **false**

When the signal is given, begin at top of the next page and work through the remainder of the booklet. There are 100 items in all.

Work rapidly. If you are not sure about something, guess at it and go on to the next item. There are no "catch" questions.

Do not ask questions. You are at liberty to refer to the directions at any time, but to do so oftener than necessary will waste time.

You may not be able to get through in the time allowed, but do as much as possible. Do not skip about. Items skipped will be counted wrong.

---

Begin Here:

(1) If you save $8 per month how much will you save in six and one-half months **Answer** ( )
(2) "Par Value" is an expression used in connection with **stocks** **dividends** **currency** **good-will**
(3) Douglas—shoes:: Eastman—**finance** **kodaks** **fruit** **textiles**
(4) staple—specialty **same** **opposite**
(5) The motive behind every purchase is the satisfaction of one or more instinctive desires. **true** **false**
(6) cigarettes—packages:: flour—**mill** **wheat** **bread** **sacks**
(7) F. W. Woolworth's chief success was won in **banking** **merchandising** **mining** **shipping**
(8) Credit enables a man temporarily to control more wealth or property than he owns. **true** **false**
(9) The Burroughs is a kind of **multigraph** **adding machine** **phonograph** **typewriter**
(10) If you buy ten shares of stock at $50 per share on the installment plan, how long will it take you to pay for the stock if you can pay only $25 per month? **Answer** ( )

. . . . . .

(90) George M. Reynolds is a **banker** **merchant** **miner** **shipper**
(91) How much does a firm lose when it can earn 10 per cent a year on its working capital, and it neglects to take advantage of a discount of 5 per cent for cash on a purchase of $2,000 payable in 90 days? **Answer** ( )
(92) Darwin P. Kingsley is a powerful figure in **insurance** **office appliances** **merchandising** **shipping**
(93) sales manager—salesman:: captain—**ship** **company** **private** **general**
(94) jobber—wholesaler **same** **opposite**
(95) A company is insolvent when it has insufficient cash to pay its debts. **true** **false**
(96) "Armco"—trade name:: American Rolling Mill Co.—**title** **copyright** **sheet metal** **company**

(97) A large industrial university is maintained for employees by which of the following companies? **U. S. Steel** **Goodyear** **Prudential** **Woolworth**

(98) The fiscal year for government business ends **December 31** **April 30** **June 30** **September 30**

(99) The best salesman is the one who always directs his selling talk to the reasoning processes of his prospects. **true** **false**

(100) The only state in the union which has two Federal Reserve banks is **Texas** **New York** **Ohio** **Missouri**

TEST 5

WILL-TEMPERAMENT TEST

*Part 3*

**Check the ONE trait in each pair which is the BETTER in most circumstances. For example, if it is better to be careful than careless in most circumstances, check careful in the first pair. Do not skip any pairs.**

| | | | |
|---|---|---|---|
| careful | careless | dull | clever |
| accurate | inaccurate | natural | affected |
| slow | quick | coarse | refined |
| tardy | punctual | ugly | handsome |
| gloomy | cheerful | straightforward | deceitful |
| vain | modest | scrappy | peaceful |
| selfish | unselfish | sociable | unsociable |
| polite | impolite | yielding | stubborn |
| conceited | not conceited | intelligent | unintelligent |
| cowardly | brave | lazy | industrious |
| honest | dishonest | sensitive | callous |
| self-conscious | not self-conscious | self-confident | self-distrustful |
| generous | stingy | normal | queer |
| proud | humble | loyal | disloyal |
| graceful | awkward | aggressive | bashful |
| witty | not witty | low-minded | pure-minded |
| moral | immoral | emotional | unemotional |
| effeminate | manly | untidy | neat |

(Time limit: 45 seconds)

*Part 9*

**Check the ONE trait in each pair which describes YOU better. You may be in doubt in some cases; for example, you may be careful in some things and careless in others, but as a general rule you are more often one than the other. Check that trait. Do not skip any pairs. It will make no difference if you do not finish the whole list, speed does not count.**

(Same list as for Part 3)
(Time limit: 60 seconds)

TEST 6

SERIES 12 (KENT-ROSANOFF LIST)

Below is a list of 100 words. Write after each word the first word it suggests (the first word that comes to your mind).

Do not write sentences.

Do not stop to think.

Work as quickly as you can.

Examples

cow..... *milk*
grass..... *green*
school..... *teacher*

1. table.....
2. dark.....
3. music.....
4. sickness.....
5. man.....

The remaining words in the list are

6. deep
7. soft
8. eating
9. mountain
10. house
11. black
12. mutton
13. comfort
14. hand
15. short
16. fruit
17. butterfly
18. smooth
19. command
20. chair
21. sweet
22. whistle
23. woman
24. cold
25. slow
26. wish
27. river
28. white
29. beautiful
30. window
31. rough
32. citizen
33. foot
34. spider
35. needle
36. red
37. sleep
38. anger
39. carpet
40. girl
41. high
42. working
43. sour
44. earth
45. trouble
46. soldier
47. cabbage
48. hard
49. eagle
50. stomach
51. stem
52. lamp
53. dream
54. yellow
55. bread
56. justice
57. boy
58. light
59. health
60. bible
61. memory
62. sheep
63. bath
64. cottage
65. swift
66. blue
67. priest
68. ocean
69. head
70. hungry
71. stove
72. long
73. religion
74. whiskey
75. child
76. bitter
77. hammer
78. thirsty
79. city
80. square
81. butter
82. doctor
83. loud
84. thief
85. lion
86. joy
87. bed
88. heavy
89. tobacco
90. baby
91. moon
92. scissors
93. quiet
94. green
95. salt
96. street
97. king
98. cheese
99. blossom
100. afraid

WEIGHTING SYSTEM FOR TESTS

Name..... Date.....

| *Test* | *Score* | *Critical Score* | *Weight* |
|---|---|---|---|
| Business Information..... | ——— | If 55 or more, check | 7 |
| Parts 3 and 9..... | ——— | If 54 or more, check | 10 |
| Series 12..... | ——— | If 71 or more, check | 6 |
| Length of line, left to right..... | ——— | If more than 5 inches, check | 7 |
| Length of line, right to left..... | ——— | If less than 5 inches, check | 6 |
| Mental arithmetic, number of withdrawals of eyes..... | ——— | If 0, check<br>If 1, check | 9<br>8 |
| Objections to purchase..... | ——— | If 21 seconds or less, check | 6 |
| Impulsive lines in signature..... | ——— | If *Yes*, check | 2 |
| Work better in summer or winter. | ——— | If "no difference," check | 1 |
| Work better on rainy or sunshiny day..... | ——— | If "no difference," check | 1 |
| Income from work at age of 55... | ——— | If $20,000 or more per year, check | 3 |
| Ability to do good work while being watched..... | ——— | If *Yes*, check | 1 |
| If he does not possess any of the traits of failures which might detract from his sales ability, check | | | 10 |
| | | Total | — |

If this total score is 40 or more, it indicates that this man will probably turn out a success.

If the total score is 12 or less, it indicates that this man will probably turn out a failure.

Remarks:

# The Minneapolis Meeting

## Report of the May Conference on Educational Personnel Research and Student Guidance[1]

By Arthur W. Kornhauser, *University of Chicago*

THE principal papers and discussions of the Minneapolis conference may be grouped under four heads—those presenting ideas on the personnel point of view in general, those concerned with appraisal of student abilities, those dealing with vocational guidance, and those reporting research in the field of personality traits and their estimation. A little attention was also devoted to problems of educational guidance and placement and to mental hygiene work. There was clear recognition that these latter topics deserve greater emphasis; their more adequate treatment has merely been postponed, for practical reasons, until next year's meetings, which will probably be held about January 21 in New York. The several topics mentioned are very briefly summarized in the following paragraphs.[2]

### THE POINT OF VIEW IN PERSONNEL ACTIVITIES

The personnel point of view was most in prominence during the two joint sessions where the personnel workers and the deans of men came together. The papers and discussions of these meetings (especially the addresses of Deans Coulter, Clark and Bradshaw, and of Dr. Mann and Mr. Hopkins) emphasized with equal vigor the need of sound scientific methods and devices based on empirical investigation, and the importance of personal skill and sympathetic understanding in dealing with students. Fundamentally these two points of emphasis are of course compatible—and this appreciation of the need for a nice balance between the science and the art stood out with unusual clarity before the discussions

[1] The Conference was held at Minneapolis on May 14 and 15, 1926, under the joint auspices of, and in coöperation with, The Personnel Research Federation, The National Research Council Committee on Personnel Research, The Annual Conference of Deans and Advisers of Men, and The University of Minnesota. The program, arranged by Dr. P. S. Achilles and a committee of the Personnel Research Federation, was published in the May number of the Journal of Personnel Research.

[2] Abstracts of all the papers referred to in this report are on file at the offices of the Personnel Research Federation, 40 West Fortieth Street, New York. Further details concerning the content of any paper can be obtained by writing to this address.

terminated. Just as in the medical field, here too there is need for skilled practitioners as well as for scientific investigators—and not infrequently the two abilities may be happily combined in a single individual.

In addition to the dual emphasis on scientific methods and on the personal touch, certain other views were expressed which are significant for sound personnel thinking. Mr. L. B. Hopkins made the point that college personnel work is essentially part of a general movement to individualize education. Some agency is needed, in the school as well as in industry, to represent the outlook of the individual worker or student. "In many situations," Mr. Hopkins suggests, "there seem to be more pressing and more immediate factors to be considered, and it is a simple thing for this point of view of the individual to be overlooked." The personnel point of view—the recognition of individual and personal considerations—is needed all along the line, in problems of the curriculum and teaching as well as in selection of students or in guidance and placement.

Dr. C. R. Mann called attention to the need for clearer formulation of the scope and interrelations of personnel work than has yet been accomplished. He proposes that our thinking can be organized within the following three divisions: (1) Job specifications; "making a record of things people ought to be able to do and are actually doing." (2) Analysis of individuals; study of the qualities and abilities of people. (3) Adjustment of people to their work; bringing of jobs and men into satisfactory working relations with one another. Work needs to go forward in a coördinated way in these several fields, all looking toward the securing of greater satisfactions for the individual and increased welfare for society.

In connection with these broader discussions of personnel, it is fitting to mention the valuable evening session devoted to the work of the University of Minnesota. Three papers by Dean Johnson, Dean Haggerty, and Professor Boardman respectively, gave an excellent set of practical illustrations of college personnel problems and scientific attacks on these problems.[3] The inseparable interconnection between student personnel problems and questions of higher education in general, was particularly apparent. The need and the possibility of research on a great variety of college problems received effective statement, and the emphasis was given point through the citing of empirical investigations which are actually being conducted in the selection and guidance of students and in educational methods.

### THE APPRAISAL OF STUDENT ABILITIES

The round table devoted to "Psychological Methods of Measurement" was given over to a discussion of *what* we ought to measure. What should be our criterion and our objectives in setting up selective and guidance machinery? The group es-

[3] These papers are now available in a special supplement to the Educational Record.

pecially considered the pros and cons of occupational analyses—descriptions of what college men do in the business world and elsewhere—as bases for determining the selection and training of students. It was agreed that while these studies furnish one useful method for deciding what to measure and how to use the measurements, conclusions must be drawn with caution if unwise limitations on the college population and on college training are to be avoided. Other matters briefly discussed were the financial evaluation of the results of measurement methods, and the problem of using measurements in sectioning classes.

A number of papers reported progress in the measuring of scholastic promise. Professor Thurstone described briefly the work being done in connection with the coöperative test program of the American Council on Education. During the year 1925–1926, 166 colleges and universities participated in the project. Norms are available for the eight parts of the examination, and the standing of the several colleges in each part has been obtained. Correlation figures were not yet available at the time of the report.

Professor Toops discussed another coöperative test undertaking, in which the colleges of Ohio are participating. He detailed certain possibilities of research and gave suggestions for the procuring and handling of data.

Professor Stoddard discussed the results from the use of the Iowa Placement Examinations in about one hundred institutions. In general, they gave better predictions both of average success and of achievement in particular courses than did high school marks or intelligence tests. The report emphasized the desirability of using the tests not merely for prediction but also as aids in individual guidance and in making necessary adaptations of educational methods. Further favorable data were given by Mr. Langlie who told of work at the University of Minnesota which showed the usefulness of the Iowa examinations in predicting the work of students in engineering, chemistry and agriculture.

Professor Hartson reported very good correlations between a series of language ability tests (English) and first semester grades, English composition grades, and foreign language grades of students at Oberlin College. Miss Davidson gave the results of tests in the Women's College of Brown University. Fairly high correlations were obtained with scholarship and the evidence showed that high school records could be valuably supplemented by test scores. Professor Miner studied correlations between intelligence test scores and the grades of students through their four years of college. The coefficients showed marked decreases beyond the first semester, with interesting differences in trend between the College of Arts and Science and the College of Engineering.

The general problem of appraising student abilities for purposes of admission and placement received excellent treatment by Dean Johnson (in the paper already referred to) and by Dr. Cowdery. Both at the University of Minnesota and at Stan-

ford University, procedures of selection are being evolved on the basis of careful statistical studies. Three sets of facts are being used in judging candidates: (1) previous scholastic records; (2) psychological test scores; (3) ratings of personal qualifications. Results of some value are apparently being realized by means of these combined bodies of data. Dean Bradshaw also sketched a proposed plan of selective admission to be used at the University of North Carolina. The outstanding feature of this method is to be the *informing* of prospective students regarding their probabilities of college success as judged by test scores and previous records. The decision whether or not to enter the University will be left to the student and his family.

Two papers were presented which have to do with the improvement of college marks and their use as criteria. Professor Bohan proposes that letter ratings be supplemented by percentile ranks or standard deviation scores, and that a basal group be adopted as a standard in relation to which all other groups must be graded. Professor Weersing points out the desirability of transmuting letter grades into sigma-values rather than using arbitrary numerical equivalents.

### VOCATIONAL GUIDANCE

The five papers on vocational guidance can be very briefly summarized. Two of them (by Miss Rosenstiel and Miss Blake) consisted of detailed practical statements of what the vocational interviewer should be and of how cases should be handled. Interesting illustrative cases were cited. Professor Dyer, on the basis of one hundred interviews with students, pointed to certain factors which seem to have played a part in determining the individuals' choice of their life work. Professor Kitson emphasized the importance of collecting facts concerning the vocational histories of college men, and of making this information available for college students. The point was illustrated by facts collected about college professors in two institutions—their age at receiving promotions and their salaries at different stages. Professor Cunliffe described the courses he gives which aim to help the student appraise himself and which give information about occupations.

The vocational guidance luncheon was attended by 22 persons, most of whom are in charge of a bureau of vocational guidance in a college or are contemplating the organization of such a bureau. An informal report was given by each person regarding the activities which he is carrying on. The chief topics of discussion were: methods of imparting information about vocations; tests for the measurement of intelligence, interests, and vocational traits; and the technique of individual counselling. The reports presented revealed a number of institutions which, without much publicity, are carrying on promising enterprises in vocational guidance. They also revealed that there is greater activity in the smaller institutions than in the larger ones.

### PERSONALITY TRAITS AND INTERESTS

There were several papers which dealt with rating scales. Mr. Hanna presented evidence to show that

teachers' ratings of personal qualities of students are partially a function of the courses in which the ratings are given. He concluded that the ratings received in different classes should be recorded and used separately. The writer reported results from the routine use of a graphic rating scale for judging students. Extreme students were stated to be reliably differentiated from others. The most important factor determining unreliability was the lack of close acquaintanceship between raters and students. Miss Manson secured self-ratings and ratings by acquaintances on thirteen social traits among several groups of college women. Interesting differences in standards of rating were revealed from group to group, from one trait to another, and between ratings by self and ratings by others. Professor Porter compared students' intelligence test scores with their estimates of self-consciousness and success in the test. No agreement was found between actual success and estimated success, but there was a tendency for low score students to rate themselves more self-conscious than the average.

Miss Heidbreder secured ratings of people on personality traits which are frequently asserted to be characteristic of the extrovert or introvert "type," and also traits supposed to reveal an "inferiority complex." The traits for each of these types were found to hang together as a consistent whole, with the extreme groups clearly differentiated. Many interesting details were reported concerning the ratings.

The reliability of interest-analysis by means of questionnaires on likes and dislikes was studied by Miss Hubbard. The reliability coefficients were about 0.5 and 0.6; individual scores were found to be "surprisingly permanent." Miss Myer found that preferences on an interest questionnaire could be used as a helpful supplement to intelligence tests in giving predictions of college success.

### EDUCATIONAL GUIDANCE AND MENTAL HYGIENE

As was stated in the first paragraph of this report, questions of mental hygiene and educational guidance were definitely in the background at the conference. They received indirect and passing mention on a number of occasions, but the only frontal attack on them was made in one of the round table luncheon meetings and in three quite diverse papers.

A brief paper by Dean Wilkins described the aims and procedures of "Freshman Week" as it operates in the University of Chicago. Mrs. Holbrook reported the results of an intensive comparison of successful and probation students at Northwestern University. Interesting group differences were revealed. Among the important factors were mental alertness (test scores), high school preparation, health, intellectual interest, social maladjustment, home conditions, outside interests or work, and too much time to social or athletic activities. No one handicap or group of handicaps appeared to be characteristic of probation students, but rather an *excess number* of handicaps as compared with those of successful students. Miss Stinchfield told of

some of her work on speech defects among students at Mount Holyoke College. She emphasized, with illustrative evidence, the close connection between speech defects and emotional instability or general maladjustment in college work and activities.

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Taken in their entirety, the meetings gave a valuable snap-shot of what college personnel workers are doing and thinking. The research reported was, on the whole, less striking and less encouraging than were the expressions of broad and fundamental attitudes and principles that need to guide personnel activities. What was lacking in finished pieces of research was made up for in the quite general appreciation of the need and importance of more and more scientific work in the field. The next few years are likely, if one may predict, to bring forth a rapidly increasing body of established knowledge with regard to those activities which the personnel group already agrees are the things to be done.

# Book Reviews

## INTELLIGENCE AND IMMIGRATION

*By Clifford Kirkpatrick. Baltimore: The Williams & Wilkins Co., 1926. Pp. 127*

REVIEWED BY CARL C. BRIGHAM

This monograph presents data derived from the application of the Illinois and Army Beta tests to four main nationality groups, as follows: Americans (N = 94), Finns (N = 144), Italians (N = 96), and French Canadians (N = 155). The children tested were all eleven years of age, and were in the schools of Fitchburg, Maynard, Leominster, and Northbridge, Mass. The Italian children showed the lowest test records, the Americans and Finns the highest records, with the French Canadians falling between. No significant differences were found between Americans and Finns.

Dr. Kirkpatrick spent a considerable amount of effort in trying to estimate the effect of possible linguistic handicaps on the test results. He did not succeed in eliminating the language factor, but he cannot be accused of ignoring it, even though his efforts to estimate its amount were unsatisfactory. He finds marked differences in the intelligence of the immigrant groups, and finds that the linguistic handicap fails to explain away the differences found.

The statistical analysis is careful and painstaking, but somewhat limited. On the other hand, the logical analysis of the situation is very keen. The review of the literature of the subject in the first part of the monograph is well-balanced, cautious, and penetrating.

## SOCIAL CONSEQUENCES OF BUSINESS CYCLES

*By Maurice Beck Hexter. Boston and New York: Houghton Mifflin Co., 1925. Pp. xxiii + 206*

REVIEWED BY DAVID R. CRAIG

Most of the research in business cycles has dealt with the phenomena of the business world: with prices and production and their interrelationships in terms of time and cause. There have been some noteworthy exceptions, and this book is one of them. Dr. Hexter has approached business cycles from the viewpoint of a social worker, and with the approved technique of the economic statisticians he has made an excursion into the sociological aspects of the ebb and flow of trade.

From the city of Boston and the practically coincident territory of Suffolk County he secured monthly reports from 1900 to 1921 of births, still-births, deaths, marriages, and divorce libels applied for. These figures he treated intensively with the methods which have been perfected by the Harvard Committee on Economic Research. In computing seasonal variations, the relationships of the seasonal variation of his series, the cyclical fluctuations, the relationship of the cyclical swings to each other and to indexes of the business cycle, Dr. Hexter must have performed an enormous amount of clerical labor. A more intensive cultivation of the data

would be difficult to imagine, and the thoroughness of his work is marred only slightly by his neglect to describe any peculiar attributes of the population with which he dealt.

It is impossible to summarize in a brief review the many interesting relationships which Dr. Hexter discovered. Perhaps the most interesting can be shown by presenting one of his own tables (p. 161). Here he shows the correspondence in time between his sociological series and established business series, in terms of correlation coefficients.

| PAIRED VARIABLES | CORRELATION COEFFICIENT | TIME RELATIONSHIP |
|---|---|---|
| Birth-rate and wholesale prices | +0.705 | *Conceptions* lead by 8 months |
| Birth-rate and unemployment | +0.696 | Births lead by 17 months |
| Birth-rate and death-rate | +0.553 | Births lag by 12 months |
| Stillbirth-rate and wholesale prices | +0.348 | Stillbirths lead by 2 months |
| Death-rate and wholesale prices | +0.613 | Deaths lead by 17 months |
| Death-rate and unemployment | −0.361 | Deaths lead by 10 months* |
| Marriage and wholesale prices | +0.469 | Marriages lag by 1 month |
| Divorce and wholesale prices | −0.308 | Divorces lag by 24 months |

* When the death-rate leads by 25 months, the coefficient is +0.620.

The author emphasizes the antecedence of the social fluctuations in relation to the business swings. He says (p. 169): "In this study we have seen that fluctuations in conceptions *precede* fluctuations in wholesale prices by about eight months; fluctuations in the birth-rate *precede* fluctuations in unemployment by about seventeen months. We have further noted that fluctuations in the death-rate *precede* fluctuations in wholesale prices about seventeen months; and that fluctuations in the death-rate *precede* fluctuations in unemployment by about ten months." From the quoted table and paragraph it is clear that the book has the wrong title; the word ***consequences*** implies a lag in time and a causal connection which do not appear in the text. "Social Antecedents of Business Cycles" would have been more accurate.

Finally, from the anticipation of his sociological series he deduces so suggestive a contribution to the theory of the origin of business cycles that it (pp. 173–175) may be quoted in some detail:

"There can be no doubt that the social series, which we have shown to precede cyclical fluctuations in economic series, reflect powerful occurrences in society. Not only do they indicate these occurrences but they determine many others. The death-rate, for example, may be representative, in a crude way, of the morbidity existing at any particular moment. The birth-rate, too, reflects deep-seated changes in the emotions of men. . . . . We can stay close to reality and throw out the suggestion that these fluctuations in the birth-rate and the death-rate may possibly have something to do with the early beginnings of business fluctuations.

"Let us see how this may occur. A man leaves a sick child at home. He goes to a meeting of the directors of his corporation. A project to expand and capture new markets is suggested. The man cannot devote his full thought to the discussion; his mind is in the sick room at home. He proposes that the decision go over until the next meeting. His emotions are infectious. He carries his point.

"Another man leaves the hospital after calling on a sick friend. He begins to ponder on the purposes and plans of life. He asks the eternal question: Whither away? He wonders whether it is all worth while. He goes to his office. Decisions must be made, but he cannot concentrate. He can forget neither his sick friend nor his philosophical speculations. Under the circumstances he postpones decisions.

"Still another is told on his return home that a child can be expected in due course. He is thrilled. He must prepare financially for its coming. He quickens his efforts. He wants to rise high in his field of endeavor. He works harder and better. He achieves more. His results reflect his redoubled efforts.

"Such instances of the actual effect of deaths and births upon men are not unusual. . . . . Business enterprise is the application of mental effort to the transformation of our physical environment. Anything which affects the emotions of men must necessarily affect their ability to make decisions, anticipate decisions, or postpone decisions. The errors of optimism and the errors of pessimism may be closely connected with these variations in human emotions. It may well be that these waves of emotion which run through society from time to time are very closely related to these variations in births and deaths."

Here is shaky ground. Yet Dr. Hexter's deductions pose interesting questions for the behaviorists (both in psychology and economics) to solve. Exactly what, for instance, is the influence of emotional depression on the ability to make business decisions. Do emotional exaltation and depression exert the same influence on executive ability? These questions might be referred to psychologists. To the economist and the manager might be delegated the task of answering another set: Does the postponement of business decisions affect their validity or their influence on the success of the enterprise? And the growing body of industrial psychiatrists might inquire into the question: What have optimism and pessimism to do with the case? Indeed, they have already made some progress with it.

The answers to all these questions, if they are ever satisfactorily reached, will throw important light on what Thurstone has called the variables of personnel research, working and living. And personnel workers, while they will accept Dr. Hexter's qualified suggestions slowly, must be grateful to him for his measurements.

## VOCATIONAL SELF-GUIDANCE

*By Douglas Fryer, Ph.D. Philadelphia: J. B. Lippincott Company, 1925. Pp. xvii + 379*

REVIEWED BY RUTH M. HUBBARD

This book is primarily intended for the use of intelligent men or boys who are uncertain as to how to get a foothold in the occupational world. For them it suggests means of rating themselves and of comparing themselves with others of their acquaintance in personality traits such as appearance, self-directive ability, leadership, industriousness, coöperativeness, etc. Following this complete introspective personality analysis is a general discussion and functional classification of occupations. Emphasis is placed on the need for authoritative occupational information in order to discover the place which most nearly corresponds to one's own capacities and abilities. Each job entered is to be regarded as a stepping stone so that vocational guidance is a progressive affair, continuing through the whole life of the individual as long as he may make vocational choices.

Part II is made up of discussions by experts in various professional business fields. There are chapters on advertising, publicity, journalism, industrial purchasing, salesmanship, merchandising, personnel administration, banking, engineering and some others. Nearly all of these discussions include rather definite information as to the requirements (personal, intellectual and educational) for success in the particular field, the pay or salary, the opportunities and "glories" of the occupation and the service it renders society. Many of them also discuss disadvantages of the profession, conditions of employment and organization of the profession as a whole and method of entering the occupation including the definite steps in the advance from low positions to higher.

Part III is made up of two chapters by Dr. Lorine Pruette on opportunities for women in business.

Part IV gives detailed directions for finding positions, selling one's qualifications and assisting one's own advancement.

The book is written in conversational fashion giving in a comprehensible way the psychological and vocational methods that may be useful to a young man seeking an occupation. There are annotated bibliographies on mental tests for adults, on vocational guidance and self-guidance and on general occupational information as well as on the specific professions. A list of occupations and the schools where specialized training for them may be obtained is given in the appendix to Part I.

As far as the psychologist is concerned the book supplies no new information aside from that contained in the discussions of particular professions. From the standpoint of method, the vocational psychologist might well be critical. Self-guidance as presented by Fryer is dependent upon the method of self ratings. Herein is the striking methodological weakness. Rating techniques are notoriously unreliable as demonstrated by the work of Rugg, Kingsbury, Paterson, and others, unless adequately safeguarded. These safeguards are conspicuously absent. Furthermore, what little we do know about self-estimates (Hollingworth) leads us to discount them as possessing little more than chance accuracy. Hence the psychologist must remain skeptical when a method of self-guidance utilizes not only an unsafeguarded rating technique but also employs self-estimates as the modus operandi. In addition, Fryer fails to profit from analyses demonstrating the relativity and non-universality of the very personality traits listed. Altogether, it would seem that such self-estimating and self-analyzing might be as likely to misinform the seeker of guidance as to properly enlighten him regarding the way he should go.

# Abstracts

*How Good Lighting Benefits the Shop.* A. G. ANDERSON. Management and Administration in Manufacturing Industries, November, 1925, Vol. 10, No. 5, pp. 277–281.

Reports that 90 per cent of the manufacturing plants throughout the country neglect their factory lighting. Only eight states have minimum lighting standards. One accident in eight is due to poor lighting. Good lighting would lessen fatigue and would increase production 10 per cent. Discusses some characteristics of good lighting. Lights should be of suitable quality, proper direction, and correct intensity. The background should be well illuminated and general illumination should be good. Mazda lamps have been developed to approach sunlight in quality, and mercury arc lights are highly satisfactory for fine work. Shadows must be natural and reflected light should be abundant so as to provide uniform illumination. The minimum of illumination for visual efficiency is between ten and twenty foot-candles.

*Does Accident Prevention Pay?* G. A. ORTH. Annals of American Academy of Political and Social Science, January, 1926, Vol. 123, No. 212, pp. 20–26.

Describes accident prevention as an essential factor in production. Accident prevention increases the quantity and quality of goods produced and therefore the amount of profits made. Accident prevention increases production, decreases overhead, decreases labor turnover, saves money compensation. A coöperative movement of accident prevention includes the educating and training of workingmen in habits of thoughtfulness and carefulness.

Describes a coöperative Safety Committee. Money expended for safety appliances and salaries of safety engineers is balanced by increased hours of production, by conserving the worker's physical ability, by preventing dislocation of the organization, by maintaining the morale of the workers, and by avoiding loss in time and wages in training fresh hands.

*Safety in the Steel Industry.* CHARLES L. CLOSE. Annals of American Academy of Political and Social Science, January, 1926, Vol. 123, No. 212, pp. 86–92.

Reports the organization and results of safety campaigns in the United States Steel Corporation. The two main safety factors found after investigation were: (1) perfection of engineering devices, (2) education of the employees. Extensive efforts were made in both these fields with the result that accidents were reduced 60 per cent from 1906 to 1912. The prime requisite for success of safety regulations is coöperation between the employer and the employee.

*The New Era for American Workers.* JAMES J. DAVIS. Industrial Management, April, 1926, Vol. 71, No. 4, pp. 218–220.

Immigration restriction and its vital effects upon American industrial civilization are here reported. Restrictions have been placed upon foreigners coming into this country since 1880 but these restrictions have not been strong enough to prevent the 14.7 per cent of our foreign born population furnishing 20.63 per cent of the population in our jails, almhouses, insane asylums and other social institutions housing inadequates. American workers are not only directly affected by the admission of large numbers of competitive workers; they are also indirectly affected by high taxes needed to support such social institutions.

The American worker will benefit by the greater hurdles in the way of physical and mental tests imposed upon immigrants, and the establishment of our inspection machinery abroad for the selection of desirable immigrants. His wages will be higher, his taxes will be less, and he will be

able to maintain a higher standard of living, which is the right of every American citizen.

*Photometric Methods for Studying and Estimating Suspensions of Dust, Fumes, and Smokes.* PHILIP DRINKER, R. M. THOMSON, AND JANE L. FLINN. Journal of Industrial Hygiene, December, 1925, Vol. 7, No. 12, pp. 567–576.

Describes the use of photometric methods for determining the size and dispersion of particles of dust, fumes, and smoke. Tolman and Vilet's Tyndallmeter with a Macbeth photometer is used for finding the size. The measuring scale differs from the original Macbeth illuminometer in that the scale is standardized for one-fourth foot-candles in place of three foot-candles. Owen's contrast method, contrast between two adjacent surfaces, is another method used. Advantages of the photometric methods are the rapidity with which readings are made and the fact that no laboratory work is required. Disadvantages are they are expensive and require care and accuracy.

*Organized Labor's Plan to Solve Housing Problem.* Babson's Reports, Business Supplement, March, 1926, p. 6.

The American Home Builders, Inc., is an Ohio corporation designed to be a holding company for a national organization of mortgage institutions. It is "to reduce the cost of home ownership to workers and to originate safe and profitable investments." The project is backed by the Railroad Brotherhoods.

Walter F. McCaleb, the organizer of the Engineers' Coöperative National Bank of Cleveland, is president. W. G. Lee, president of the Brotherhood of Railroad Trainmen, is chairman of the Board of Directors.

McCaleb states his program and policies to be: (1) not actually to construct buildings; (2) to see that his men buy their homes at the right price; (3) to see that financing is done on a reasonable basis, with no bonuses or commissions; (4) to attack the problem of secondary financing; (5) to build up a number of subsidiary corporations which shall undertake to do the financing and the supervising of the work among the men within definite districts.

To maintain the American standard of living during the years of severe competition which lie ahead, it is essential that more workers own their homes.

The ventures of organized labor into the field of finance and business will make the relations between capital and labor more tolerant.

*Fact and Metaphysics in Economic Psychology.* FRANK H. KNIGHT. American Economic Review, June, 1925, Vol. 15, No. 2, pp. 247–266.

Shows why sociology and economics cannot escape from confusion in methodology by adopting the methods and categories employed in the natural sciences. This confusion exists because the subject matter of the social sciences consists very largely of controversy over definition and method. These sciences are also characterized by a pronounced irritation on the part of a large proportion of their workers at this situation, and this is the reason for the attempted change.

The conclusion is not, however, one of mere pessimism and hopelessness. The situation is not as bad as it seems, as it is necessary and proper for the question of objectives to occupy a large, if not the main part, of social discussion. This is because social science cannot, like the natural sciences, be restricted to the problem of means for achieving objectives taken for granted.

*A Sound Basis for Wages.* JOHN P. FREY. American Federationist, January, 1926, Vol. 33, No. 1, pp. 26–34.

Should wages be increased? Employers are never at a loss for reasons for not increasing them. Adam Smith gave employers what they considered a conclusive argument—he believed that natural laws determined all activities and results in the field of commerce and industry. Employers are often governed by selfish motives. Practical experiences of early trade unionists demonstrated that the positive conclusions of early economists were unsound. Workers discovered that collective action enabled them to secure higher wages. Trade union leaders began to study more carefully the question of wages. Fair day's

wage was difficult to define, also a living wage or a saving wage. Localities paying very low wages are not able to support large industries. After the industrial revolution a great increase in national wealth took place; men have harnessed the forces of nature and production has been greatly increased. Modern industrial production and transportation have created new causes of unemployment, and changes in the world markets. Per capita production in our industries has increased 40 per cent since 1899 while real wages during the same period have increased 4 per cent. American Federation of Labor has adopted as the principle to be the basis of wage determination: "Social inequality, industrial instability, and injustice, must increase unless the workers' real wages, the purchasing power of their wages, is increased in proportion to man's increasing powers of production."

*Factors of Industrial Housing.* RUSSEL J. WALDO. Management and Administration in Manufacturing Industries, November, 1925, Vol. 10, No. 5, pp. 251–254.

Describes plans adopted by a typical community and gives cost data on eighty-eight important projects, including the following: Morgan Park in Duluth, Minnesota; Eclipse Park in Beloit, Wisconsin; Viscose Industrial Village, between Chester and Marcus Hook, Pennyslvania; and Union Park Gardens in Wilmington, Delaware.

Discusses for the projects studied by the author the following factors: prevailing material used in various countries, approximate costs, final return from houses, whether rented or sold, distance from plant, size of lots, gardens, alleys, etc., and segregation of nationalities.

*The Salaries Salesmen and Sales Executives Are Getting; What Determines Them.* JOHN ALLEN MURPHY. Printers Ink, April 1, 1926, Vol. 135, No. 1, pp. 73–79.

Discusses salesmen's salaries, salary dead lines, and advancement of sales executives.

Finds in the tax returns of 1922 that out of 110,000,000 population:

594,211 people get $10,000 or more
1,784,326 people get $5,000 or more

There are 300,000 people in selling pursuits. In determining the following data the actual experience of over 200 companies was used. Salesmen's salaries were as follows:

1. Grocery field:
   - Traveling grocery salesmen: $30 to $60 weekly.
   - Grocery specialty salesmen: $50 to $100 weekly.
   - Crew managers and minor sales executives: $4,000 yearly.
   - Branch, district, and assistant sales managers: $4,000 to $10,000 yearly; average $6,000.
   - Sales managers: $8,000 to $25,000 yearly, average $15,000.
2. Drugs, hardware, oil, electrical specialties, dry goods:
   - Traveling salesmen: $1800 to $4200 yearly.
   - Under-executives and sales managers: $4000 to $10,000 yearly.
3. Advertising:
   - Junior salesmen: $2000 to $4200 yearly.
   - Senior salesmen: $4000 to $8000 yearly.
   - District manager: $10,000 to $12,000 yearly.
   - Branch Manager: $15,000 yearly.

Salary dead line among salesmen is being destroyed, due to profit sharing and bonus plans (pay according to accomplishment). This gives rise to wide discrepancies in salary range. Pays low *nominal* salary, thus doing away with many unproductive salesmen and executives. Pays the man for work done and initiative. This gives the salesman a chance and an incentive to get ahead.

*The Shorter Workday.* JAMES M. LYNCH. American Federationist, March, 1926, Vol. 33, No. 3, pp. 291–295.

Advances arguments for the shorter workday. The Industrial Revolution has both accelerated and menaced human happiness. Instead of throwing humanity into a scrap heap European population has been increased from 130,000,000 to 450,000,000 through the growth of industrialism, improvement of machinery, and cheapening of

goods. Machinery is valuable to the social scheme as Labor's policy is to increase wages proportionately to the power of production.

But labor saving devices do increase unemployment, if introduced too rapidly, as increases in demand do not balance other situations created. For example, an alarming unemployment situation was averted by the Great War.

Great Britain's plan to help the worker is degrading. Shorter hours is the remedy. Stabilization of employment would be of national benefit. Conditions have always improved at each reduction of hours and capital can well afford to pay for the increased wage costs. The shorter workday is not a pernicious evil. If it is, then every citizen should work till fatigued. Greater leisure is necessary for social progress. Slaves never contribute to society. Organized Labor can serve society best through "increased industrial efficiency which should enable all men to procure the means of livelihood and cultural growth with less labor."

*The Tardiness Problem and How It is Handled By Eighteen Employers.* NELLE SWARTZ. Industrial Bulletin, February, 1926, Vol. 5, No. 5, pp. 120–121.

Describes an investigation conducted by the Bureau of Women in Industry on methods of handling the tardiness problem in factories and mercantile establishments. Describes means taken by management to secure prompt attendance, and the part promptness plays in size of pay envelope at end of the week. Methods used by these establishments are described in detail. Concludes that the reduction of tardiness requires check-up of each instance.

*The New and Advanced Position of Organized Labor.* WILLIAM GREEN. Industrial Management, April, 1926, Vol. 71, No. 2, pp. 211–224.

There is a decided change in mental attitude and judgment regarding rules and laws which govern the payment of wages. Believes salvation of wage earners rests on basis of high living standards and perfect coöperation between all forces of production. Worker is an important industrial factor, and is justified in asserting his moral claim for enjoyment of a just share of the ever increasing benefits that labor has produced.

Labor is basing its demand for higher and higher wages upon its contribution to industry.

Wages must be maintained on high level so that purchasing power of masses corresponds to producing power of workers.

Concludes that organized labor is committed to maintenance of high wages and high living standards.

*The Payroll Savings Plan.* A. S. MARTIN. American Bankers' Association Journal, April, 1926, Vol. 18, No. 10, pp. 725–726.

Describes the Payroll Savings Plan as adopted by the Continental and Commercial Trust and Savings Bank of Chicago.

The obstacles to saving are: (1) There is too much temptation to spend when workers are "flush;" (2) inertia—bank is too far away.

To overcome these obstacles the following plan is followed by this bank:

A list of firms interested is prepared. The representative of the bank calls upon the proper executive and gets his sanction. Then he sells the workers on the plan.

An agreement is reached with employees, who approve of the plan through a card signature system, to have their employer hold out a certain amount of each pay check.

The employee receives a receipt book each pay day, while the employer gives one check to the bank to cover the sum total of the amounts pledged by the employees.

Letters of encouragement are sent to employees from time to time so that the practice of saving will continue. Employees have the option of dropping the plan when they desire. There is no compulsion to continue if once started.

*Tests for Transportation Pilots.* A. J. SNOW. Journal of Applied Psychology, March, 1926, Vol. 10, No. 1, pp. 37–51.

Describes tests used by the Yellow Cab Company at Chicago and elsewhere in rejecting unsuitable applicants, with a re-

sulting decrease in accidents. Four major tests are used: physical examination, intelligence, emotional stability, and recklessness.

The intelligence test is of the conventional group type with certain modifications of the method of explaining the test. The work thus far indicates that average or superior intelligence is no index to a person's ability or inability to drive a vehicle safely, but very low inteligence is invariably an index.

The emotional test requires the subject to press two pedals with his feet and hold a switch closed with his left hand while with his right he lights a series of lamps in order by touching terminals with a stylus. There are two other switches at his right, one for foot and one for hand, and he is told that if anything unusual happens he must shut off the current by operating these switches. After he has lighted a few lamps he receives an electric shock and a heavy arc is created between two electrodes about 10 inches in front of his face. The time required for him to operate the emergency switches is automatically recorded.

The recklessness test comprises a board with four irregular lanes cut in it. They have the same destination, but the longer routes are the narrower. The subject chooses one and traces through it with a stylus as rapidly and accurately as possible. Contacts with the edge of the lane are recorded electrically. His tendency to slow down at critical points in the path is likewise noted.

The minor tests include muscular fatigue, muscular resistance, reaction time, and perception of space and motion.

*Selecting the Right Type of Office Worker.* KATHERINE M. H. BLACKFORD, M.D. Office Manager, June, 1925, Vol. 1, No. 5.

Discusses some aspects of character analysis. The office manager who "selects" a good worker really knows what he is doing. He knows about her health; about her intelligence ("if he is well trained, his judgment will be at least as accurate as if he had kept his applicant and himself busy for hours on examination paper"); he knows about her honesty and industriousness. Not only that—by using the technique of character analysis he can know also her likes and dislikes, compatibility, subordination, steadiness, obedience, versatility, speed, and ability to handle the public.

By using character analysis "it is possible to know what people are by looking at them." "Character analysis, as the result of observations upon many thousands of people in all walks of life and in all parts of the world—observations recorded, verified, classified, digested, and applied—has found out what these 'excellent judges of human nature' see in a man's face and body that tells them what he is."

But "mistakes will be made—many of them, for it is only by repeated error and correction that anyone can acquire judgment and skill in the application of any knowledge or the practice of any art. In the light of this almost obvious truth, one marvels at the naïveness of ponderous college professors who fill pages of solemn books with charts and tables to prove character analysis is impossible because people who have had no instruction or practice in the science and art cannot accurately judge a human being by looking at a conventional photograph. As well try to prove that medicine and surgery are fakes because laymen cannot accurately diagnose disease by feeling the pulse."

This article contains several illustrations of the characteristics of normal blondes and normal brunettes, those of concave and convex profiles, and those of concavo-convex profiles. "Yes, you will find apparent exceptions, first, because not all people are normal; second, because other qualities may strongly modify those indicated by color."

*Personnel Work with the Los Angeles Police Department.* GRACE M. FERNALD AND ELLEN B. SULLIVAN. Journal of Delinquency, January, 1926, Vol. 10, No. 1, pp. 252–267.

Gives a report of an investigation made in connection with a survey of the personnel of the Los Angeles Police Force. Tests were given (1) to 1712 men comprising the entire Police Department of 1923, (2) to 824 students at the Police School, (3) to 625

Civil Service applicants to the Police School and (4) to 1769 students entering the University of California, Southern Branch, in September, 1923.

In the Police Department survey of 1923 all men were given two forms of the Army Alpha, and all men scoring less than 50 on the second Army Alpha test were given the Terman Group and National Intelligence Tests. The range of scores was wide (3 to 201 on the first test, and 6 to 198 on the second) showing a practically unselected group. Correlation between scores on the two tests was high, and wide variability occurred only in the relatively high scores. Comparisons of groups within this group shows patrolmen have widest range. The sergeant group tested lower than the patrolman group, showing that the system of promotion and selection did not raise men of highest mentality and allowed men of lower mentality to be advanced. The scores of all groups contained both high and low scores. In the Terman group test and the National Intelligence test, the low scores made on the Army Alpha were verified.

In comparison with the University group the police group was much lower, but there was a considerable number of policemen who scored as high as the best university students. In comparison with Army scores the police group scored only slightly higher, the police sergeant group being lower than the army sergeant and corporal group.

As a result of the survey a Police School was established with a three months course with pay. All students had passed regular civil service examinations. These men were also given the Army Alpha test. When this test was repeated two weeks after school started (some men having been dropped), the mean was increased. Those who were dropped scored much lower in the Civil Service examinations than either the police group of a few days or weeks, or the total police group. Evidently many candidates had been dropped for some equivalent of limited intelligence. Two conditions of elimination in the Police School which were interesting were lack of satisfactory record for ten previous years of life and lack of progress in learning at this school.

A mental test was included as part of the civil service examination, serving two purposes: (1) saving money by not training candidates who could not profit by training, (2) avoiding injustice to candidates, that is, keeping men who would later be dropped, from entering school and giving up their jobs.

Because the mental requirements were raised, some changes in civil service requirements were necessary, one change being the reduction of the height requirements by one inch.

Three main results of the work of the Police School were:

1. Selection of intelligent men for the Police School and the elimination of the unintelligent.
2. Training of these men for jobs.
3. Greater inducement for men of intelligence to go into the work. The raise in general average to meet the requirements will probably mean that the pay will have to be increased.

Mental tests are advocated only as an initial time and money saving step in the process of selection. Adequate follow-up work is necessary. In time tests which are particularly adapted to police service and which are now being developed, will be available.

*A Genetic Scheme for the Classification of Personalities.* EDMUND S. CONKLIN. The Pedagogical Seminary, December, 1924, Vol. 31, No. 4, pp. 316–332.

Offers a classification scheme for personality differences based upon genetic psychology. The scheme proposed consists of four psychological dimensions supplemented by several temperamental or somatological groups.

The first dimension is that of attention. The author believes that we might characterize individual human beings quite regardless of sex or age according to the place where each apparently belonged upon a scale ranging from that individual whose attention was determined exclusively by the innate conditions of attention to that rather hypothetical individual whose attention was determined by acquired conditions of

attention the content of which was largely abstract in nature. The second dimension is the scale of intelligence. The third dimension is the noetic scale. The noetic dimension is in terms of the form of thought which dominates the individual's life. From a genetic point of view the noetic dimension begins with the purely sensory experiences of infancy, then ranges clear through perception, imagination and intuitive thinking to the achievement of skill in the testing of inferences, and beyond skill to the habit of logically defensible thought. The fourth dimension is the moral. These four dimensions must be supplemented by the recognition of several diathesic differences or types of a (probably) non-dimensional nature. Three diatheses may be recognized: The balanced, the cyclothymic and the epileptic. These are doubtless attributed to some fundamental peculiarity of the physiology largely conditioned by the functioning of the endocrine system.

Using his scheme a person may be classified as: "Tom Jones—Extraverted, normal or average intelligence, noetically imaginative to intuitive, morally low to average, of balanced diathesis." The remainder of the article is given over to a comparison of this scheme of classification with the systems of Jung, Rosanoff, Downey, and McDougall.

*Personnel Work in Colleges.* L. B. Hopkins. News Bulletin of the Bureau of Vocational Information. September, 1925, Vol. 3, No. 9, pp. 65–67, 69–71; October, 1925, Vol. 3, No. 10, pp. 73–75, 77–80; November, 1925, Vol. 3, No. 11, pp. 81–83, 85, 87.

Personnel work must rest on a recognition of individual differences in human beings. It will be successful in any institution only to the extent to which this point of view is assimilated by the entire organization.

Personnel functions include selection, development and placement. The personnel department coördinates all agencies within the college charged with student service or research and maintains personal contacts with individual students, faculty, administration, organizations and secondary schools.

*On the Effects of the Loss of Sleep.* Thomas Fister Weiskotten. Journal of Experimental Psychology, October, 1925, Vol. 8, No. 5, pp. 363–380.

Reports results of an experiment on himself as subject, to measure the immediate and remote effects of fatigue induced by loss of sleep. The experiment extended over seventeen days and the author acted both as subject and experimenter. On the ninth, tenth, and part of the eleventh days of the experiment no sleep was taken. The experiment was controlled by means of a series of mental and physical tests during the entire period. During the experiment introspective notes were taken regarding appetite, feelings, expression and general health.

Conclusions are: (1) Fatigue induced through loss of sleep to a certain point acts as a stimulant upon the mental powers. (2) Unless continued to a great length, loss of sleep does not seem to affect either the mental or physical powers to any appreciable degree. (3) After a certain point loss of sleep affects the mental powers to a considerable degree, acting upon them indirectly by diminishing the power of concentration. (4) Memory and speed seem to be more greatly affected than accuracy. (5) From the findings obtained in the measurement of weight, to a certain limit nature restores the energy lost through lack of sleep and hidden stores of surplus energy are drawn upon. Therefore the amount of sleep which can be lost without harmful effects depends on the constitution of the individual. (6) Bodily temperature and pulse rate are both lowered by continued loss of sleep. (7) It requires but little sleep more than that ordinarily required to recuperate from the effects of loss of sleep. (8) The dangers accruing from loss of sleep occur in cases where this loss is prolonged beyond certain reasonable limits, or where such loss is habitually repeated.

# News Notes

PERSONNEL RESEARCH FEDERATION

*Activities of Member Organizations*
*Scovill Manufacturing Company*

Since 1923 the Scovill Manufacturing Company of Waterbury, Connecticut, has been conducting a series of research studies in the selection of factory personnel. The central problem of the research has been to determine whether any of the measurable or definable attributes of an applicant for employment can be used statistically, either singly or in combination, to predict his probable success in any given occupation.

The Scovill Company manufactures many large and small articles of brass and other metals, such as lamp fixtures, buttons and fasteners, vanity cases and other containers for toilet preparations, automobile parts, radio condensers, screws, springs, pins, valves, etc., etc. It has an extensive casting shop, and brass rolling mills, tube, rod and wire mills. There are also the various departments involving both skilled and unskilled work, such as tool-making and tool-setting on the one side, and trucking, yard and construction laboring on the other, which contribute to the activity of such an establishment.

The employees of this company are of all degrees of skill, and probably of all degrees of intelligence; they are English speaking and non-English speaking, men and women of many nationalities, and of various amounts of school training, years of age, and experience.

For the purpose of the study, extensive records including test scores, records of age at the date of hiring, years of schooling, ability to read English, country of birth, color, and former experience with the company in the same occupation or in other occupations, have been compiled for all newly hired employees, over a period of two years, and these figures have been tabulated and are being studied for each occupation. Search is made for any significant relationship between these figures and the available criteria of success at work.

The difficulties which arise in a study of this sort are due, first to the large number of unmeasured variable factors in the total situation for the employees of any group; secondly, to the necessity for very careful analysis of all occupations for the sake of reasonable homogeneity of the groups studied; and thirdly to the unreliability of the available criteria of success. All of these difficulties have received very careful attention in the Scovill Company studies,—none of them is completely overcome.

Results showing a certain statistical reliability have been obtained in some 45 occupational groups covering just about one-half of the large number of records collected in the two years, and the study of the rest of these records is continuing. In the meantime, records are still being collected for all incoming employees, and the company has proceeded to the second step of an experiment of this sort. For the 45 occupations represented by the studied groups, the results so far obtained are being used, not inflexibly, but as offering valuable information to be weighed with other items, in the actual selection of employees. Full records are kept of all employees hired under this plan, whether the selection is in accordance with the results of the study or not,—in the latter case with reasons for the contrary action,—and eventually these records, too, will be studied. That is to say, evidence of reliability or unreliability will be sought in practice as well as by formula.

The practical possibilities of application of the results of such a study as this, in case they do eventually warrant applica-

tion, are far reaching. It is not a long step from hiring to transfer and promotion, and it is evident that the possibilities in this direction are the first to appeal spontaneously to the employee who is tested. Reduced turnover, increased efficiency, greater contentment,—these are possible goals.

*Young Men's Christian Association*

With the recent national reorganization of the Young Men's Christian Association in this country, three primary units were formed; the Home Division, including all work in America; the Foreign Division, including coöperation with Association movements in more than thirty countries abroad; and finally the Personnel Division, serving both Home and Foreign personnel needs.

Personnel Service in the Young Men's Christian Association contemplates in the main the study of the Secretariat itself, a body of over 5000 employed officers serving mainly the American Associations, and including perhaps 200 men specially chosen for service with Association movements of other countries. All problems relating to source of supply, qualifications for success, placement, turnover, growth and development in effective leadership, and retirement, are included in the purview of this division's commission.

The significance of this new phase of service may be more readily appreciated from the following observations:

1. The Young Men's Christian Associations of this country have enormous contacts with youth. In their formally registered membership are 550,000 young men and boys under twenty-five years of age. Another 200,000 high school and older grade boys are found in High School Clubs and Christian Citizenship Clubs in groups outside the regular membership. Among the more than 2,000,000 different individuals served by one or more activities in American industry, a very large number are young men and older boys. Fourteen Merchant Marine Associations are in contact with over 40,000 young men in this service; while the Associations at Army and Navy posts are constantly in touch with the 126,000 young men of these two services, whose uniform is their membership ticket. Referring to the first three groups mentioned above, they are found largely in the heart of over 700 chief cities of America, not to mention rural communities, colleges, and universities, and special industrial centers. Here are contacts unlimited!

2. These contacts mean educational opportunity. They are all voluntary. They begin with individual interest and grow to a spread of interest which may involve the full ideal of four-square Christian character implied in the physical, intellectual, social and religious development of life. Behind this symbol lies a sound philosophy of the unity of life. This conception is, in effect, the very substance of the best educational philosophy today. The Young Men's Christian Association is primarily an educational enterprise. It seeks, through making the fully developed life attractive, to rely upon the voluntary interest of boys and young men for the achievement of character education. A considerable measure of success has attended this effort, and perhaps some service to formal education, to social work, to religious agencies, and to citizenship.

3. American communities evidently desire this service more today then ever. Single cities are now carrying out successful campaigns for as much as five to ten millions of dollars. There are now scheduled for early effort approximately fifty millions of dollars worth of new city buildings. The American public is willing to provide generously for equipments within which the Association may carry forward these educational and character-building activities with American youth.

The main question which arises is this: "If the service which emerges from this vast equipment is in reality an educational program, are the Association Secretaries who operate it prepared to function as educational leaders?"

The present day program of local Associations is basically educational. A thorough-going restudy of all program features is in process with a view to making the character education values of this pro-

gram even more effective. Scientific technique and careful experimental methods are being used under skillful and trained leadership; and their work is being received with great favor throughout the country.

But are Association Secretaries prepared to function as educational leaders? It would, perhaps, be fair to say that while a minority could no doubt thus qualify, the great majority of the more than 5000 men have their primary strength in administration and promotive work. Clearly, however, the realization is coming that to these necessary aspects of leadership there must be added a positive qualification for the determination of life values among youth and definite, if informal and voluntary, educational guidance of youth toward their self-realization. Even the work of management itself becomes essentially educational in the light of character objectives set up. The present research projects dealing with secretarial personnel are to be carried forward in the light of these trends.

*Research Projects*

There are four groups of research projects. The first group deals with projects having to do with prediction of success in the secretaryship. The problems are: (1) to devise, verify and improve a Graphic Rating Scale for use in judging the performance of new entrants to the secretaryship over a given period; (2) to test the validity of the "certification process" now employed by the Association as a basis for official certification of approval of new entrants to the profession; (3) to ascertain the prognostic value of various phases of college experience (and other personal history data) for determining probability of success in the secretaryship; and finally, (4) to devise and try out a special vocational aptitude test for the Association Secretaryship.

The second group includes projects having to do with training, and with Secretarial personnel administration in general. The problems are; (1) to conduct job analyses of the Secretaryship in its various forms, using the best available techniques or developing new techniques as may be necessary; and (2) to make exhaustive survey of the educational content of present training processes utilized for preparation for the Association Secretaryship; and to develop an ideal curriculum covering both scientific and project training.

The third group carries projects having to do with the Secretary in relation to his task. The problems thus far outlined are; (1) to study the technique of placement now in operation, and to devise a more effective method for placing the right man at the right task; (2) to determine measures of effectiveness of the Secretary's workmanship; (3) to devise and test a promotion scale for secretaries; and finally, (4) to study the relation of tenure to efficiency, to ascertain and evaluate the causes determining tenure, and to study the problem of growth.

The final group includes a single undertaking, namely, a process of inquiry to determine the factors which produce the present secretariat, to evaluate its effectiveness in the light of the results of other projects as listed, and to devise and test experimentally a plan for unifying the recruiting, training and placement processes now operating.

Another undertaking relates particularly to the special problems of the Physical Directorship.

Mention should be made of two general policies in the handling of such research projects. One is that wherever possible men of special scientific training are associated with the study, at least by direct access if not by actual membership in the particular group guiding each project. The other principle is that these studies are used educationally by associating qualified Association secretaries with the group responsible in each case. In particular an important body of fifty of the most capable secretarial leaders in the entire group of 5000 are coöperating as a body to foster research. They have been at work for some years. They meet annually and are known as the Conference on the Association Profession.

Nothing has been said heretofore regarding the possibilities of intensive personnel work within the operating program

itself as conducted by local Associations across the country. Something has been done in vocational study, guidance, and employment service in a number of City Associations. "Find Yourself Campaigns" in Boys' Departments have had many good results, though far too much is being carried out as isolated events rather than as a uniform guidance process, employing a method perhaps more useful for its stimulation than for its prognostic value. Student Associations have made considerable use of vocational conferences and the presentation of vocational information to student bodies. In the United Y. M. C. A. Schools, which major in vocational education, much of it among adults, a considerable personnel service has been worked out, including use of standard tests in use in other colleges and universities. All of this work in the program field needs expansion and development, but is not included in the immediate task of the Personnel Division.

As a concluding word, it may be suggested that such studies as are proposed for the Association Secretaryship are rather a new departure in that group of welfare and "religious callings" so long falsely isolated from other vocations by a mistaken view of their special character. The ministry, to mention only one other, stands greatly to gain by some similar study of its functional detail. It is hoped that the above described studies may be helpful in a pioneer way among various allied vocations, and to a degree among other parallel organizations. Nor should one fail to add that wide-awake students of personnel problems in the Association movements of many other countries are already seeking aid. This newly created Personnel Division hopes that its studies may be of some help both to Young Men's Associations and to other movements in the thirty countries with which it has direct contacts.

*Harvard Bureau of Vocational Guidance*

The Bureau of Vocational Guidance, Graduate School of Education, Harvard University, during the past year has continued its work of instruction, conferences, correspondence, and research. The Director is engaged in the work of instruction and in the correspondence and conference activities of the Bureau. The instruction includes a basic course in the principles of vocational guidance and in education as guidance. In addition Dr. Richard D. Allen of Providence, Rhode Island, has a course in educational and vocational counseling. The seminary course in 1924–25 has published "Case Studies in Educational and Vocational Guidance" recently issued by Ginn and Company. The class for the preceding year published "Mental Measurement in Educational and Vocational Guidance," a pamphlet issued by the Harvard University Press. The class during the past year has been working up cases in the administration of educational and vocational guidance, and this work will be continued during the year 1926–27.

Research by advanced students has yielded "Guidance for College Women" by Dr. Mabelle B. Blake, Director of Personnel, Smith College, D. Appleton and Company; "The Orientation of College Freshmen" by Dr. Henry J. Doermann, Dean of Administration, University of Porto Rico, Williams & Wilkins Company; and "Vocational Guidance in Colleges" by Dr. Lewis A. Maverick, registrar and Lecturer in Education, Southern Branch University of California, Los Angeles, Harvard University Press. The last named book will be issued about November. A thesis has just been completed on vocational guidance in rural communities by Dr. Clarence E. Partch who becomes Associate Professor of Education, Rutgers University, New Jersey, where he will undertake field work in vocational guidance and instruction in the college.

Another doctor's thesis deals with vocational guidance in teachers colleges with particular reference to the State of Texas, by Benjamin Ford Fronabarger of North Texas State Teachers College, Denton, Texas.

A proposed research deals with a study of possible criteria for measuring the effectiveness of vocational guidance. If any readers of the JOURNAL can give the Bureau of Vocational Guidance at Harvard

any suggestion on criteria for measuring success in occupational life, they should be very grateful. An objective determination of what success is seems necessary to measure the effect of guidance.

The correspondence and conferences of the Bureau are related usually to questions concerned with the organization and administration of vocational guidance in schools, colleges, and other institutions. Thus a recent exchange of information with China indicates the vitality of vocational guidance interest there and asks for suggestions on specific problems.

The Vocational Guidance Magazine is the chief interest of Mr. Frederick J. Allen, Research Associate of the Bureau, and editor of the magazine. The magazine is growing in its scientific character and in its circulation.

### STEPS IN EMPLOYMENT RESEARCH

At a luncheon conference of the Committee on Methods of Research in Industrial Relations, on May 26, 1926, Dr. W. V. Bingham discussed the scientific method in employment research. Dr. Bingham used as the basis of his talk the following outline taken from a forthcoming volume on employment research prepared by Dr. Max Freyd and himself:

1. The first step is to decide upon the occupation for which an improved method of selection is to be devised.

2. The next step is to make a job analysis, to ascertain the precise duties and activities of the occupation—just what the worker does, what tools he uses, etc. The investigator will also want to know what the conditions of work are, the hours, the sources of applicants, the relation to other jobs in the organization, the opportunities for promotion and the most frequent reasons for leaving.

3. The investigator should then in consultation with the responsible executives decide upon a criterion of success in the occupation. This is necessary in order to have some measure with which to compare the results of the experimental procedures in selection.

4. The next step is to choose persons to serve as subjects for the investigation. The investigator will be guided in his choice by the criterion of vocational success which has been agreed upon.

5. The investigator then proceeds to determine at least provisionally the abilities most essential for success. This step is facilitated by having for observation the workers who have been chosen as subjects for the investigation.

6. In the light of his analysis the investigator selects or devises psychological tests, questionnaires, rating scales, or other examinations which give promise of measuring these essential abilities.

7. Under carefully controlled conditions the investigator next applies these means of measuring abilities to the subjects chosen for the investigation.

8. At or before this stage of the research the reliability of the examinations should be determined. By "reliability" is meant the accuracy or dependability with which a test predicts itself. A test or rating scale which does not give the same results upon repeated trials is as unreliable for purposes of vocational selection as an elastic tape would be for measuring stature.

9. After the reliability of the examinations has been ascertained, their validity as indicators of success in the vocation is determined. The investigator validates a measuring instrument by comparing his measurements with the criterion of vocational success. A devise is valid and useful which yields measures so closely related statistically to the criterion of success that, knowing a person's score, his degree of success in the occupation may be at least roughly foretold. The value of the examination depends upon the closeness with which it predicts the vocational success of the applicant.

10. The next step in the research is to find out what combination of the several examinations which have proved to be valid, yields a total score with a maximum predictive value.

11. The investigator will then have to justify this battery of tests or other aids in selection by comparing its predictive accuracy with that of the methods of selection previously in use.

12. If the new methods prove to be more

efficient and are recommended for adoption, he installs them as a part of the employment procedure. He should also assure himself from time to time that they are being used properly, and should check their predictive accuracy frequently in order to adjust them if necessary to changes in industrial demands or type of applicant.

At the same luncheon Miss Millicent Pond gave a summary of the results of the test studies she has been making at the Scovill Manufacturing Co. She has evaluated a number of tests on factory employees using length of service and foremen's ratings of ability as measures of success. By the method of critical scores she found that a series of tests similar to Army Alpha and Beta could foretell adequately in the case of about twenty different factory occupations whether or not the newly hired worker would remain with the company six months or longer.

### OCCUPATIONAL ANALYSIS OF THE MEDICAL PROFESSION

The Commission on Medical Education of which President A. Lawrence Lowell is chairman, has undertaken to make a comprehensive analysis of the duties of medical practioners as a basis for recommendations regarding the improvement of medical education. The broad scope and fundamental nature of the investigation is indicated in the following quotations from a letter written by the Commission's Director of Study, Willard C. Rappleye, M.D., of Yale:

"The Commission was organized by the Association of American Medical Colleges as an independent agency to make a study of the various problems of medical education. The desire to make a general study grew out of the rigidity and over-crowding of the present medical curriculum, due to the increasing regulations laid down by various groups interested in the field of medical licensure and medical education; and it was felt that a general study of the whole situation ought to be made before possible changes were suggested.

"The Commission as selected represents men interested in general and graduate education, others devoting themselves to the basic sciences of medicine, still others interested essentially in clinical medicine and several representing groups concerned with medical licensure. Membership of the Commission includes Walter L. Bierring, George Blumer, Hugh Cabot, Samuel P. Capen, William Darrach, David L. Edsall, Sir Robert Falconer, Henry G. Gale, Walter A. Jessup, A. Lawrence Lowell, Lafayette B. Mendel, Wm. Allen Pusey, Olin West, Ray Lyman Wilbur, and Hans Zinsser. Later as special phases of the general question are taken up, additional personnel may be added to the Commission or special assignments made to sub-committees. As yet, however, we have not reached that stage inasmuch as we are concerning ourselves now with some of the general questions.

"Since about 80 per cent of the medical graduates go into practice, we have started out on a study of a number of questions relating to general practice and have sought first to secure information regarding the needs of various types of communities for medical services. This information we are seeking from published material that is available such as the incidence of illness in various industries, results of physical examinations of large groups of individuals, including the results of the draft-board examinations of Great Britain and the United States, the illnesses which bring people to out-patient services, and the results found in the panel system in Great Britain. These various isolated studies throw pretty accurate light on the incident disabilities and illnesses, although they are not completely satisfactory.

"The second approach we are making is on the basis of an analysis of general practice in communities of fifty thousand or less in thirty-five states, where we are attempting to secure samples of the daily experiences of men in general practice, particularly of relatively recent graduates. While the former studies will give a pretty good idea of the needs of communities, the latter will give us a clue as to the demand that is actually being made upon physicians. Such studies will give a very fair idea of the objectives of the medical preparation, although, of course, we have

in mind the great importance of training physicians broadly in the basic sciences so that they may later be somewhat prepared for future advances in methods and in medical science.

"We are also assembling a good deal of information about the number of applicants for admission to medical schools, the number who graduate from medical schools relative to the number of admissions, and numerous questions of a statistical character from information which is largely available in the files of the Council on Medical Education and Hospitals of the American Medical Association.

"This in a general way is what we are attempting to do. The essential study is one of professional specifications and will be an attempt to contribute something to the problem of the larger responsibilities of medicine from the standpoint of medical personnel, specialization, distribution of physicians relative to needs, relationship of medicine to public health, and the problem of recruitment of medical students."

### A COURSE IN OCCUPATIONAL SURVEYS

After one year of experiment the College of Business Administration, Northeastern University, gave to its entire sophomore class the year 1925–26 a course entitled "Occupational Surveys." No texts were used, but a list of assigned readings from 200 references was provided.

For the first two months discussion and assigned references followed these topics: value of purposeful vocational study with the end in view of an ultimate occupational selection based on design rather than upon mere drift; the fluidity of the vocational selection concept; comparative occupational opportunities in the various sections of the United States; six steps in vocational choice; technique of occupational analysis.

From the outset, it was apparent that the occupational horizon of the men, though all were high school graduates, was narrow. Upon request to designate those business occupations which the class of 40 men would like to consider, they could at first think only of an aggregate of 92 occupations, or about 2½ a man with the assumed overlapping or duplication.

The men were then given the announcement for the second semester's work: the composition by each man of five papers, each 4000 words long, on five different occupations in the field of business. This meant instead of 92, 200 occupational papers, spread over the field of approximately 40 business occupations. When the men tended to concentrate upon too few occupations, such as sales and advertising, they were successfully urged to pay attention to the occupations overlooked.

Thereafter, from November to January, the class read extensively many references to widen their view and enlarge their knowledge. From November on the instructor's lecture-discussions were supplemented by 25 outside lecturers, executives such as credit managers and statisticians generously proffered by Boston firms.

Beginning in February the students wrote their papers, using the foregoing material, supplemented by a wide bibliographical supply, and especially with individual, systematic interviews with employers and executives in the designated occupation. One such interview was required for the first paper, two for the second, and so on, till the fifth paper, for which five interviews were required. This made a total of 600 interviews by members of the class. Further information may be had from the instructor, P. Evans Coleman.

### CONTROL OF INDUSTRIAL RELATIONS IN ITALY

A far-reaching experiment in social control was inaugurated in Italy on May 18, when the newly created Ministry of Corporations was vested with the power to regulate, by means of elaborate administrative machinery, the entire problem of industrial relations. Thirteen national associations, including all classes of workers and employers, will supplant the old unions. Three national confederations, representing respectively manual workers, employers and professional people, will be created for liaison purposes. An undetermined number of corporations are to be created as instruments of control by the Ministry of Corporations.

All labor disputes must hereafter be sub-

mitted to compulsory arbitration by special courts set up for the purpose. While wide latitude is granted for collective and even individual contracts the Government is empowered to intervene and insist on a change in the terms of contracts of any sort. The present Fascist Confederation of Labor Unions will be retained temporarily, while the new machinery is being organized. —*The Guaranty Survey.*

FORECASTING UNEMPLOYMENT

According to the New York Times a committee of economists which has been studying the problem of unemployment since the industrial crisis of 1921 has made public a plan to forestall periods of extensive unemployment. The study was made under the direction of a committee of the American Statistical Association, of which Mary Van Kleeck, director of the Russell Sage Foundation's Department of Industrial Studies, was Chairman.

The plan calls for the collection of employment statistics by State labor bureaus, with the United States Department of Labor the coördinating center. In addition, the plan commends and urges the extension of the regular collection of employment statistics by Federal bureaus having a direct relation to certain industries, such as the Geological Survey for mines and quarries, the Interstate Commerce Commission for railroads and the Department of Agriculture for farms, and the reporting of all these data to the Federal Bureau of Labor Statistics for prompt publication of national indices of employment.

Answers to two main questions are sought in the proposed monthly surveys: the total number of employes on each payroll and the total amount of wages paid in the monthly payroll period. The industries from which it is proposed to collect the data are manufacturing, mining and quarrying, communication, building construction, wholesale trade, retail trade, logging and lumber work and agriculture.

"The purpose of the plan," the report states, "is to lessen unemployment by providing facts needed to understand and control fluctuations in the production of goods and obstructions to their sale. These interruptions in economic processes throw men and women out of work."

The report declares that the distress suffered by large groups of workers periodically thrown out of employment in times of business depression can largely be avoided by accurate advance information on the trend of employment. Such information, if gathered monthly under a comprehensive plan covering the entire nation and classified as to industries as well as geographically, would, the report says, enable local governments and welfare agencies to foresee widespread unemployment many months earlier than is at present possible and to initiate municipal improvements and other relief measures before a crisis develops.

The report was said to be an outgrowth of President Harding's Conference on Unemployment in 1921 and of Secretary Hoover's Committee on the Business Cycle. As an illustration of the inadequacy of existing statistics, Miss Van Kleeck, who was a member of both the President's conference and Secretary Hoover's committee, points out that the nation's most eminent economists after careful study during the unemployment emergency of 1921 were unable to determine the number of jobless workers more closely than "from 3,500,000 to 5,000,000."

CHOOSING A PROFESSION

The widespread eagerness for vocational information is well illustrated in a recent experience of the New York Herald Tribune. This newspaper has assembled and published in pamphlet form a series of brief articles by authorities in various fields of professional activity on the topic "Choosing a Profession." Announcement was made that copies would be sent to anyone who enclosed a two-cent stamp for postage. Within a few weeks, 60,000 requests for the pamphlet were received.

# Selection of Motormen: Further Data on Value of Tests in Milwaukee

By Sadie Myers Shellow, *Milwaukee Electric Railway and Light Company*

*Readers of Dr. Shellow's previous article on "The Selection of Motormen in Milwaukee," will remember the difficulties she encountered in obtaining a satisfactory criterion of the value of the motorman selection test. The test in its present form has now been in use over a year and Dr. Shellow is able to present more satisfactory proof of its value in weeding out the unfit.*

SINCE January 1, 1925, no new motorman has entered the service of the Milwaukee Electric Railway and Light Company without having passed the Motorman Selection Test described in earlier numbers of the Journal of Personnel Research.[1] We now have a large enough group of new men in service to observe fairly well the effect of selection by means of the apparatus and method described. While the test was given previous to 1925, it was not used for selective purposes; it was still in the stage of experimentation and research.

### Choice of Criterion

The difficulty of finding an adequate objective criterion against which to check the results has been pointed out in previous articles. The proposed plan of having two qualified people, one the Chief Instructor, and the other a member of the Educational Department who had taken the training for motorman and operated a car, rate the same men, resulted in a correlation between these two ratings of 0.05 for twenty-three men.

The lack of agreement was due to many factors. The Chief Instructor was known by all the motormen; when he boarded the car, the operation was seriously influenced. On the other hand, the Educational Department representative lacked the long experience of judging operation which the Chief Instructor had. Neither set of ratings could therefore be considered reliable.

Accident records did not differentiate between chargeable and non-chargeable accidents.

The only other method was to make an intensive study of the turnover of the selected men as compared with the unselected over *the same period of time,*

[1] *Research in Selection of Motormen.* Morris S. Viteles. Part I. Journal of Personnel Research, July, 1925, Vol. 4, No. 3, pp. 100–115. Part II. August-September, 1925, Vol. 4, No. 4, pp. 173–199. *Research in Selection of Motormen in Milwaukee.* Sadie Myers Shellow. Journal of Personnel Research, October, 1925, Vol. 4, No. 6, pp. 222–237.

and with relation to the *same length of service.*

COMPARISON OF GROUPS

Two groups were selected for comparison. Group I consisted of the new men employed between January 1, 1924 and January 1, 1925. This group is designated as "Unselected"

TABLE 1

*Comparison of turnover among unselected motormen and those selected by tests*

| | UNSELECTED, 1924 | | SELECTED BY TESTS, 1925 | |
|---|---|---|---|---|
| | Number | Per cent | Number | Per cent |
| Motormen employed.... | *163* | *100* | *166* | *100* |
| In service end of year.. | 98 | 60 | 118 | 72 |
| Out of service end of year..... | 65 | 40 | 47 | 28 |
| Resigned..... | 27 | 16.6 | 33 | 20 |
| Discharged..... | *35* | *22.7* | *10* | *5.4* |
| Due to accidents..... | *23* | *14.1* | *1* | *.6* |
| Other causes..... | 12 | 7.2 | 9 | 4.8 |
| Changed to conductor... | 3 | 1.8 | 4* | 2.4 |

(This material is graphically presented in figure 1.)

Total number tested in 1925....213
Rejected..... 47 (22 per cent)
Recommended..166 (78 per cent)

* Of those who changed to conductor, three were originally recommended as conductors and one was recommended as a motorman.

since its members did not take the Motorman Selection Test.

Group II consisted of all motormen employed between January 1, 1925 and January 1, 1926. This group is termed "Selected" since its members were employed on the basis of test results.

In order that the two groups should be comparable in length of service, no separations after January 1, 1925, were considered in the first group, and none after January 1, 1926, in the second group.

So far as it has been possible to determine, labor conditions were essentially the same in Milwaukee for the two years. The number of men in the two groups is practically the same: 163 in Group I, and 166 in Group II.

Table 1 is an analysis of the separations from the company of the two groups. The most significant figures in this table are for those discharged for having too many accidents. Of the unselected, that is, of those who did not go through our selection procedure, 14.1 per cent were discharged for having too many accidents, while in the case of those selected by our motorman selection test, only one motorman, or 0.6 per cent, was discharged because of accidents. Such a large difference points clearly to the efficiency of the motorman selection test in weeding out unsafe operators. No complicating factors are here involved. These numbers can be taken at their face value and are a clear indication of what scientific selection can do to improve safety.

It is estimated that over $60,000 has been saved on accidents this year. Many years experience has shown that the large bulk of accidents are caused by *new men.* Since the new men (118) selected in 1925 constitute 14 per cent of all motormen in service, it is logical to conclude that *no small part of the saving is due to the selection of safer operators.*

Careful attention was paid to the

conditions under which the two groups worked. No new training factors were introduced. A safety program of a general nature was carried on during 1925–1926, but the effect of this program was to weed out the more incompetent men, and it increased rather than lowered the number of new men discharged because of accidents.

To further substantiate the results of the tests, it so happened that of the unselected group who were discharged for having too many accidents, four had been given the motorman selection test for experimental rather than selective purposes, and *all four* of these failed in the test. The average score for those in service is 14.5 errors. The scores for the four unselected men who were discharged because of accidents were as follows: 43 errors, 36.5 errors, 48.5 errors, 30 errors.

Had the test been used, not one of these four men would have been selected.

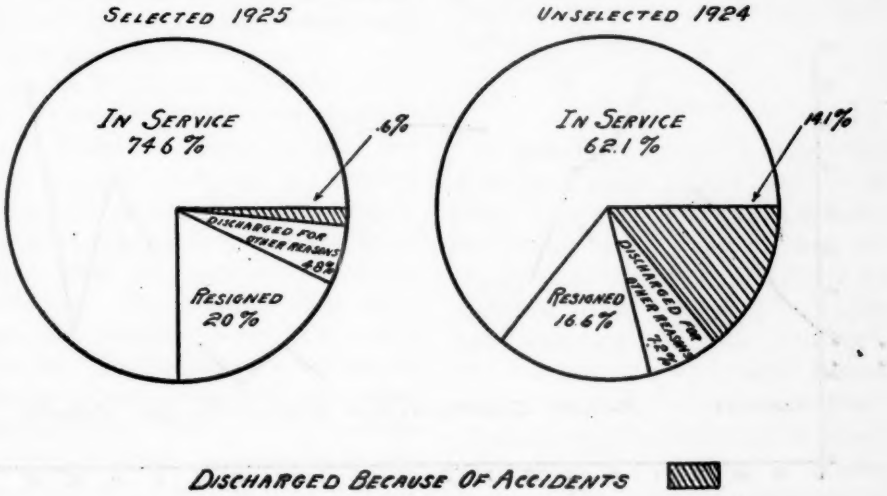



FIG. 1

### QUALITATIVE ANALYSIS OF TEST RESULTS

The final score in errors, however, is not the only eliminating factor. While a critical score or rather a critical range of scores is practical, the aim has been to increase correlation of objective scores by close observation and analysis of the behavior of the subject while taking the test.

*A. Reaction time.* With our apparatus it is possible to measure to a hundredth of a second the time for each of the seventy reactions of the test. The average reaction time together with the mean variation was determined for a large group of subjects. This average forms a standard with which to compare the individual record. Such factors as consistency in reaction time (either consistently slow, or consistently rapid, or average), and erratic behavior in this regard, are considered.

In order to take into consideration deviations in reaction time from the average, the score is determined by the following formula:

$$E \pm \frac{5 \times A.D.}{0.8}$$

E = number of errors
A. D. = average deviation of subject
0.8 = average deviation of group

Thus the score in errors is raised when the average reaction time of the subject is greater than the average reaction time of the group, and lowered when it is less.

It has been found that there are two large groups of men who make good operators. In the first group are those whose reactions are very rapid, but who have a large number of "omits" and few errors. They act quickly when they know what to do, but if they see that they cannot react before the next signal, they omit the response rather than be late. The score in errors (which includes omits) may be fairly high for this group, but is compensated for by ability to react quickly.

The second group makes very few errors and reacts slowly, but not late. A reaction is termed "late" if it comes after the periodic lights have flashed on following the signal (an interval of 1.33 seconds).

Obviously the ideal subjects are those with rapid reaction time and low error score, but both of the above two groups have proved satisfactory.

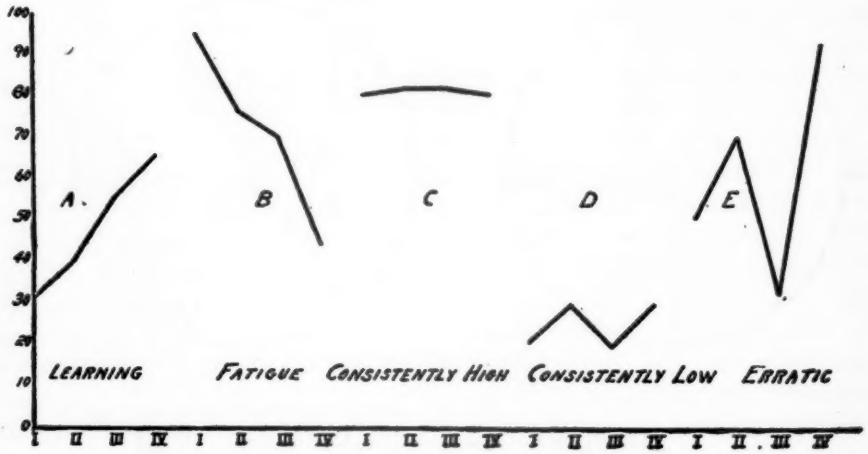



FIG. 2

*B. Behavior curve.* The duration of the test is six minutes. The test has been divided into sections and a curve showing the per cent of signals properly reacted to in each quarter is drawn up immediately upon completion of the scoring of the test. This curve is a picture of the applicant's behavior and tends to classify him. In figure 2 are five types of curves, showing the performance in each quarter of the test.

Curve A shows the individual who

adjusts slowly to the speed and variability of signals, but as he becomes more used to the rhythm and the various distractions, shows improvement. It resembles the typical "learning curve."

Curve B is quite the opposite. The subject either loses interest, becomes confused and forgets, or cannot concentrate sufficiently. It might be called a "forgetting curve" or a "fatigue curve."

Curves C and D respectively show consistently good and consistently poor responses.

Curve E shows erratic behavior, flighty attention, and distractability.

*C. Analysis of training period.* Observations made during the training period, which lasts from 16 minutes to 28 or 30 minutes, throw a good deal of light upon the applicant's habitual behavior. The training time itself indicates whether or not he is a slow learner. It also indicates whether he learns through being told, or through being shown; whether he profits by experience, notes his own errors, corrects them, or ignores them. All of these observations are helpful to the instructor who will have him in charge.

In connection with the report on the selection test score, a short description of the applicant's behavior during training and test is sent to the Transportation Department with recommendations as to special factors to be considered. For example:

"Applicant learns slowly, must be *shown* rather than *told*. Is timid, does not ask questions, but profits by his own mistakes."

"Applicant is very alert. Learns quickly and forgets quickly, becomes somewhat impatient at routine. Works better under test conditions than the regular periodic stimuli of the training period. Probably be good at handling emergencies."

"Does much better in training than test. Adjusts slowly to increased speed and variability of signals. Needs special training in emergency conditions until habits are formed."

Thus with the coöperation of the Training Division of the Transportation Department, the observations of the psychologist made during the test are put to practical use and save the time of the instructor in discovering the best method to help the applicant form safe habits.

## CONCLUSIONS

In selecting safe, steady, competent motormen, many factors need to be taken into consideration. Objective tests show *native ability* if they are properly standardized and carefully analyzed. But ability is only one half. Attitude, interest, stability—these factors do not so readily submit themselves to objective measurement. The tests *must* be supplemented with a painstaking interview of a clinical nature. The study of accidents reported in a former article has shown how important are temporary personal factors. The reasons for omits, errors, and curious behavior in the test can be brought out in an interview after the test has been given. A fairly good positive correlation with an absolutely reliable criterion is not sufficient. The interview should reveal the exceptional cases and the reasons for the exceptions.

Behavior is too complex and variable to be prophesied exactly. Simple reaction is greatly influenced by general personality. Often men who

have done poorly on the test have been put on the cars as conductors, because they were slow to adjust to a new situation, and became reliable motormen after such adjustment had been made. The experience of being a conductor often acts as a shock absorber. Much is gradually learned about the job of motorman and when the period of adjustment is over, the transfer is made and the conductor becomes a safe motorman. Many will never be safe motormen. It is necessary to consider type of behavior, analysis of reaction time, differentiation in quality of response, and interview based upon experience gained through close follow-up and observation of those recommended, in order to supplement test records and include exceptional cases. Our experience in these matters has clearly demonstrated the importance of examinations and records of this sort.

(*Manuscript received May 17, 1926.*)

# What Are Rating Scales Good For?

By Arthur W. Kornhauser, *University of Chicago*

*College personnel men as well as industrial employment managers will find this a valuable survey of the uses and limitations of rating scales. In succeeding issues of the Journal of Personnel Research, Dr. Kornhauser will present the results of an experimental study of rating scale technique.*

FEW personnel procedures have conclusively justified their existence. The sceptic can retain his honest doubts in the face of all the objective evidence we can spread before him. What we have, at best, are certain bits of valid evidence which we find helpful in forming our judgment about this or that device. Usually, in decisions regarding personnel policies and procedures, the directly relevant data are woefully inadequate—though they are far from worthless. Decisions are made largely on the basis of our impressions and feelings—the results of our unanalyzed previous experience. What we need to do is to improve these decisions, even in the absence of scientific bodies of knowledge. That means, above all else, that we must think analytically, that we must see the whole range of varied considerations which each problem involves. The fragments of evidence that are available can then be fitted into the total picture and seen in true perspective.

Rating scales, like other personnel devices, are in need of continual re-examination—critical and analytical. What is demanded is not only more factual evidence, valuable as that will be, but also a view of the entire array of evidence that is relevant—indirect, intangible, and impressionistic evidence as well as direct statistical measurements. The present paper attempts to suggest the main directions in which that evidence may be looked for.

## DIRECT AND INDIRECT EFFECTS OF RATING SYSTEMS[1]

Rating scales are simply convenient forms for securing more adequate personal estimates of people than are obtained by less formal methods. The ratings are typically estimates given periodically by executives, supervisors, or teachers concerning the workers or students under them. The judgments

[1] The discussion which follows is stated in terms meant to apply both to industry and to educational institutions. The uses of rating scales and the ends served by them in the two fields appear sufficiently similar to justify this common treatment. Slight adaptations of wording and illustration, and certain shifts of emphasis, will make the points fit one or the other field a little more specifically and concretely.

may, however, be made by acquaintances, by interviewers, by subordinates rather than by those superior in rank, or they may be ratings by the person himself. The estimates are usually of such qualities as intelligence, initiative, industry, and so on. A variety of rating procedures are in use. The methods range from the simple labeling of people as "Very Good," "Good," "Average," etc., and the arranging of individuals in rank order from highest to lowest, to more refined devices such as the Scott "man-to-man comparison rating scale" and the "graphic rating scale."[2]

The most obvious purpose of any rating system is the securing of personal information that will be useful to administrative officers engaged in personnel activities. In addition, however, important results are achieved by the rating process in the effects it has on the people rated and on those doing the rating. The procedure may also have distinct value in disseminating the personnel viewpoint and in supplying data for personnel research. The educational and inspirational effects of rating systems may, indeed, be as important as the obtaining of information about the individuals judged. It certainly is true that these less obvious results deserve careful consideration when we seek to evaluate the use of rating scales. A brief sketch of the several points follows:

*1. Personal estimates are an aid to administrative officers.* The estimates furnish useful information about characteristics and abilities over and above what is supplied in other records. Attention is called to individuals who are exceptionally strong or exceptionally weak in certain traits and also to cases where the person is rated markedly high or low by particular raters. Furthermore, successive ratings lead to a recognition of marked improvement or retrogression. As a result of these facts,—

*a.* Better guidance and training are made possible. The selection of occupation and of courses of study can be more adequately adapted to the needs and characteristics of the individual. In general, the efforts to adjust the person to his opportunities and limitations are made more effective.

*b.* Better judgments are made possible in administrative decisions concerning the individual—in matters of promotion, transfer, dismissal, granting of special privileges, wage adjustments, and so on.

*c.* Better recommendations and reference reports are made possible (especially true in the case of students who are seeking employment).

*2. The use of the personal estimates has an educational and stimulating effect on the persons who are rated.* This influence arises in two ways:

*a.* The knowledge that his abilities and characteristics are being studied and recorded leads the individual to strive to make a good impression. He

[2] Descriptions of the rating forms and discussions of the several methods may be found in the following: W. D. Scott and R. C. Clothier: *Personnel Management*, Chap. XIII; D. G. Paterson: Methods of Rating Human Qualities, *The Annals*, November, 1923, pp. 81–93; M. Freyd: The Graphic Rating Scale, J. Educ. Psychol., 1923, Vol. 14, pp. 83–102; R. W. Kelly: *Training the Industrial Worker;* H. D. Kitson: *The Psychology of Vocational Adjustment*, Chap. XII.

is likely, moreover, to be favorably affected by the thought that his personal points of excellence are appreciated and that they (as well as his deficiencies) will be used in all decisions regarding him—including recommendations to future prospective employers. He recognizes as never before that the management (or school administration) is really interested in him.

*b.* When the estimates are made known to the person in a tactful and sane manner he can gain some useful views of himself. The material is likely to make him do some real thinking about himself and his possibilities. This self-analysis in some cases will lead to serious consideration of vocational aptitudes and plans. It will also suggest the whole problem of developing a more effective personality and may lead to efforts in that direction.

*3. The making of these personal judgments has a beneficial effect on the persons doing the rating.* The procedure brings prominently to the attention of faculty members, supervisors, or executives the importance of knowing their students and workers *as individuals.* The necessity of giving estimates on personal characteristics leads the rater to a thoughtful analysis of the people rated and tends to make him more alive to his opportunities and responsibilities in developing men.

*4. The rating activities help to introduce, reënforce, and keep alive, the "personnel spirit."* Specific personnel devices and bits of technique are less important than a pervasive personnel spirit and an appreciation of personnel objectives by everyone within an organization. The use of rating scales helps significantly in this larger aim. The rating scale concerns everyone—those rated, those rating, and those using the ratings. It constitutes a natural and useful link between personnel officers and other members of the organization, leading readily to discussions of the use of rating scales in dealing with people individually and personally—and thence to the whole personnel "philosophy."[3]

*5. The ratings furnish useful material for personnel research.* Problems of selection and turnover continually call for study of the personal qualities of men as determinants of their success. Rating scales aid in ascertaining the personal traits which differentiate poor workers from good workers. They are useful in checking the results of mental tests and other selective devices. Ratings may likewise be valuable as a technique for studying such psychological problems as the existence of "personality types," the interrelatedness of traits, the influence of various factors in determining our estimates of people, and so on.

### SPECIAL ADVANTAGES OF THE RATING SCALE METHOD

The effects of rating systems which have been outlined are true in some degree of any procedure for obtaining estimates of individuals' characteristics. The standardized rating scale

[3] It is enlightening to note that the personnel system entered the Army in 1917 by the rating scale route. In a number of colleges and business establishments rating procedures have likewise been prime influences in establishing and maintaining the personnel point of view.

is ordinarily believed to possess certain special merits as compared with informal and unstandardized personal estimates. Some of the more important points usually adduced in support of the rating scale procedure are as follows:

*1.* The rating scale is analytic; it calls for judgments on a variety of distinct and defined character traits. These traits have been carefully chosen as the essential ones for the purpose. The analytic nature of the scale prevents the rater's seeing only one or two striking characteristics and omitting others. It makes the rater stop and think instead of using merely his first off-hand opinion. It also tends to keep him from letting a single general impression blind him to specific strong and weak points in the person rated.

*2.* The ratings are explicit and unambiguous, and they are recorded. This means that the estimates can be studied, compared, checked over. The person doing the rating is likely to be more careful when he recognizes that inaccurate ratings will reflect on him. More important, the ratings can be clearly interpreted; they are not vague statements which can mean almost anything that one pleases to read into them.

*3.* The ratings are uniform and standardized. Estimates given by different raters and estimates made at different times are directly comparable. These ratings can be readily compiled and summarized for use.

*4.* The ratings are quantitative. This makes especially feasible the recording, combination, and statistical treatment of the data. Judgments of different raters are easily compared with one another, averaged, or checked against independent facts concerning the person rated. Bad rating tendencies can be detected and, in some measure, corrected. It becomes possible to find out quantitatively how reliable and usable the personal ratings are.

Moreover, those rated can be directly compared with one another and the relative position of each can be stated. This is to be contrasted with the results from a non-quantitative plan of estimates. With the rating scale, such statements as this are made possible: "In intelligence, this man is in the top ten per cent of his group, according to the average rating of three supervisors." Without the quantitative scale, we would be able to say: "One judge states that the man is 'exceptionally alert and keen.' Another says he is a 'brilliant fellow,' etc." The trouble is that we do not know how these various phrases are related to one another.

*5.* Ratings are given periodically and systematically. Where this is not the case, judgments are likely to be too much colored by some recent striking achievement or failure on the part of the person rated.

*6.* Finally, some rating scales (particularly the graphic scale) are extremely easy to use. The rater does not have to rack his brain for appropriate adjectives nor to hunt for something to say.

It should be added that the actual value of all these points is not beyond dispute. The evidence in support of some of the contentions is meager. They are *a priori* arguments which

have to be accepted or rejected largely on the basis of personal opinion.

In opposition to these points it may well be argued, for example, that non-quantitative expressions of opinion about people are more personal and realistic. Specific facts can be given about the person rated and his special peculiarities can be reported in a way that is not possible in a formal quantitative rating. There is a great amount of truth in this view. Frequently one appropriate remark concerning an individual tells us more about him than would a long string of numerical ratings.

The practical conclusion is obvious. Quantitative and non-quantitative reports are not alternatives; they are supplementary. We need to use both.

### THE NEED FOR QUANTITATIVE STUDIES OF RATINGS

If the foregoing paragraphs are even approximately correct, they mean that the task of evaluating rating scales is exceedingly complex. The evidence to be weighed in any given situation ranges from detailed statistical studies of the actual uniformity of the ratings, to vague impressions about the effects on morale or the growth of personnel spirit among executives. Technical statistical studies alone can never give a final judgment as to the value of the effects produced by rating scales.

But statistical analysis of rating scale results is highly useful even though we recognize the intangible and unmeasured effects of ratings which are not appraised statistically. After all, the ratings must have some degree of reliability if they are to be useful in the directions indicated. By studying the ratings quantitatively we can learn whether they do actually show that some individuals are high and others low in the several traits. We can also see how much the estimates vary with the rater and the activities on which the ratings are based. To the extent that ratings do not show reliable differences among the people rated, to that extent their direct administrative usefulness is reduced and, indirectly, their beneficial effects on those rated and those doing the rating are also diminished.

Analytical study of the rating results is needed, then, to help throw light on how well the rating procedure works. Such study, in addition, shows some of the causes for poor results and thus makes possible corrective and remedial measures for improving the rating methods. It is this possibility of finding how well ratings are working and of ascertaining where the trouble lies, that constitutes one of the great advantages of the formal quantitative rating scale.

*(Manuscript received June 5, 1926.)*

# An Interest Test for Personnel Managers[1]

By Edward K. Strong, Jr., *Stanford University*

*Some five or six years ago research workers at Carnegie Institute of Technology pointed out the importance of the quantitative study of interests in vocational selection. Recently this emphasis has been seconded by investigators in a number of excellent research articles, several of which have been published in this Journal. Dr. Strong's article may well serve as a model for investigators. He compares the interests of personnel managers with those of a large number of men in various other occupations. He uses these comparisons to devise a scoring method which discovers how well a person's interests conform to those of personnel managers. A second article on the same subject will follow in the October issue of the Journal.*

IN THE August issue of this Journal Dr. K. M. Cowdery showed that lawyers, physicians and engineers can be distinguished from one another suprisingly well on the basis of their likes and dislikes. The necessary data were obtained by the use of an interest analysis blank made up of 263 items. The individuals tested responded to each of the items by checking "L" if they liked the item, "I" if they were indifferent to it, and "D" if they disliked it.

In Cowdery's investigation each of the three professions was contrasted with the other two combined. It might well be that lawyers are different from engineers and physicians averaged together and yet not particularly different from men in general. If this were the case the interest test would be of value in helping a man decide among these three professions but it would not be of particular help in determining which of all possible occupations a young man should enter.

In order to determine whether the interest test would disclose differences among a large number of occupations, records have now been obtained from men engaged in eighteen different occupational groups, i.e., from 49 advertising men, 63 artists, 90 authors, 73 bankers, 100 certified public accountants, 60 department store salesmen, 73 engineers, 72 executives, 57 Fuller Brush salesmen, 78 lawyers, 97 life insurance salesmen, 100 ministers, 47 office workers, 48 personnel directors, 96 physicians, 76 retail salesmen, 26 service station employees, and 66 school teachers, making a total of 1271 records.

A method of scoring the blank has been worked out for each of these eighteen occupations. What is

[1] Read in part before the Western Psychological Association, June 18, 1926.

measured is the degree of similarity or dissimilarity between a man's interests and those of the average member of a given occupational group, weight being given to each of the 263 items on the blank in terms of the difference of the group average from the average of all eighteen groups. Thus if a blank is being scored for banking interest, and the item "children" is marked as "liked," that item receives a score of 0 because bankers and men in general both like children in 88 per cent of cases. But if the item "penmanship" is "liked," that item is scored +7[2] because 69 per cent of bankers like penmanship, and only 38 per cent of men in general do so.

The assumption here is that the gross strength of any trait is not significant in vocational selection. The important factor is whether or not a man has a trait which distinguishes the occupation in question from other occupations. Thus a violinist who plays only as well as the average man finds no market for his skill. His services are valued in proportion to his superiority to others. Similarly in order to determine vocational fitness a man's traits must be evaluated in terms of the differences noticed between a given occupation and occupations in general.

In this investigation we are concerned with only two degrees of ability, not with a graded scale. Our scales are based on a definite standard of ability, e.g., in the case of lawyers, the scale is based on lawyers who have practiced law for at least five years. There is no reason why other standards may not be set up in the future to give graded scales of ability. A series of scales could be developed for several degrees of ability in law. But to do this introduces a very serious problem: how can degrees of ability in law be measured? At the present time it seems very desirable to avoid this difficulty and first of all to develop a method of separating lawyers from engineers, bankers, advertising men and the like.

To what extent can different occupational groups be distinguished from one another through use of the interest blank? In this report we shall present data with respect to personnel managers and the extent to which it is possible by means of this technique to distinguish people in this occupation from those engaged in twelve other occupations.

[2] Explanation of the weighting of differences is given in a subsequent section.

## PERSONNEL MANAGERS VERSUS NON-PERSONNEL MANAGERS

Figure 1 presents the distribution of scores for 48 personnel managers scored for interest as characteristic of their profession, also the distribution of 592 non-personnel men, representing 12 professions. In order to make comparisons easy the distributions are given in percentages:

0.1 per cent of non-personnel men fall in the upper quarter of personnel managers

0.9 per cent of non-personnel men fall in the second quarter of personnel managers

2.5 per cent of non-personnel men fall in the third quarter of personnel managers

24.8 per cent of non-personnel men fall in the lower quarter of personnel managers

*Ratings.* At the present stage in the development of this test it seems best to use but three ratings—*A*, *B*, and *C*. *A* represents a score for Personnel Interest which is obtained by the 75 per cent of Personnel managers scoring most nearly like the group. *B* represents a score obtained by the 25 per cent of personnel managers scoring least like the group. *C* represents a score that is less like the group than that obtained by any Personnel Manager. On this basis

3.5 per cent of the non-personnel group score *A*
24.8 per cent of the non-personnel group score *B*
72.2 per cent of the non-personnel group score *C*

The rating of *A* means possession of certain likes and dislikes characteristic of men in a given profession. An individual scoring *A* would probably enjoy that profession and so far the indications are that he would make a success in it. But far more data must be secured and carefully considered before such implications can be accepted as facts. An individual rating *C*, on the other hand, does not have the likes and dislikes characteristic of men in the occupation under consideration and would probably not enjoy that type of work. The rating *B* is between *A* and *C*. By definition 25 per cent of personnel managers, for example, rate *B*. But 25 per cent of non-personnel men also rate *B*. An individual rating *B* for personnel interest can not, therefore, be said necessarily to belong to the personnel group, although he may do so.

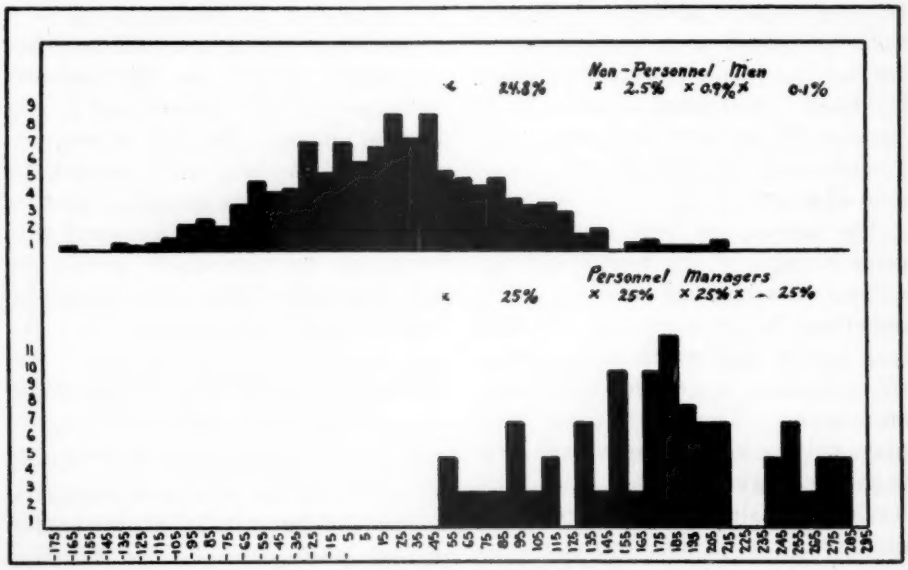



FIG. 1. DISTRIBUTION OF SCORES OF PERSONNEL MANAGER AND NON-PERSONNEL MEN ON VOCATIONAL INTEREST BLANK, FOR PERSONNEL INTEREST

It is not to be expected that any battery of tests will ever be devised which will classify every man and assign him to his proper vocation.

On the other hand, it seems likely that tests will be devised which will correctly indicate what vocations some men may and may not propitiously enter. Ratings of "Yes," "Don't Know" and "No" are consequently in order. The aim should be to use Yes and No when indications are clear that the individual should or should not enter a profession; and to extend the boundaries of "Yes" and "No" into the domain of "Don't Know." There are in existence a number of tests, such as the general intelligence test, color blindness test, Seashore musical tests, etc., that make possible a recommendation of "No" to certain individuals with respect to certain occupations. Vocational guidance bureaus could very well be established to render this service and as each new test is perfected there would be a corresponding increase in the use of "Yes" and "No" and decrease in the use of "Don't Know." Such a program commends itself to truly professional practitioners.

The ratings of *A*, *B* and *C* have been conceived in this spirit. Sufficient work has not been done with this interest test to make it possible to determine accurately the critical scores separating these three ratings. The present boundaries have been selected on the basis of a fair degree of accuracy.

General observation of all our data shows that if a man scores *A*, he has enough of whatever it is that is revealed by the Interest Blank to make good in the given profession, although there is apparently no correlation between scores within the range of *A* and degree of success. In the case of *B* scores, it appears that some men are not so successful as those who score *A*, although some are just as successful. In other words, nearly all those individuals who technically meet our criterion and so must be included in the professional group, but do not exactly fit that profession, fall into the *B* group. Thus two "account executives" of advertising agencies who in other agencies would probably be rated as "art directors" score *B*. Similarly with three other "account executives" who are more truly research men. (It should be emphasized that what is recorded in this paragraph is at the moment only a "hunch." Thoroughgoing statistical proof of the point remains to be made.)

### SCORES OF MEN FROM 12 PROFESSIONS ON THE INTEREST BLANK PERSONNEL SCALE

Figure 2 presents the distribution of the personnel group again and the distributions of the twelve professions separately which constituted the non-personnel group in figure 1. Above each graph are recorded the percentages of the particular profession whose scores fall in the first, second, third and fourth quartiles of the personnel group.

It is clear from these data that some professional groups do not overlap with the personnel group to the extent that other professional groups do. In tabular form the overlappings are as shown in table 1.

If 1300 men representing equally these twelve professions and that of personnel work were tested, 75 of the 100 personnel managers would be rated *A*, i.e., as certainly interested in

personnel work, and only 39 of the remaining 1200 non-personnel men would be so rated. The remaining 25 personnel managers would be rated *B* together with 317 of the 1200 non-personnel group. This leaves 844 of the latter group that would be rated *C*. All of the overlapping disclosed here cannot be charged against inefficiency in the test. Several of the 39 non-personnel men who are rated *A* would, in the writer's judgment, make excellent personnel managers. One of these men has contributed very greatly to personnel work in his writings, in his attendance at scientific discussions of the subject, and in the operation of the business with which he is connected.

As this test was not prepared specifically for the use to which it has been put, it is quite possible it may be revised so as to decrease the overlapping. If this decrease amounted to enough to move the personnel distribution one quarter to the right then only 10 men out of the 1200 non-personnel group would be rated *A* and 29 rated *B*. In the judgment of the writer this is the minimum overlapping to be expected; it is doubtful if this limit can be reached through the use of any revision of the test or if the actual facts warrant such a separation. The probability is that a considerable number of men have interests of such a nature that they must be classified in more than one occupational group.

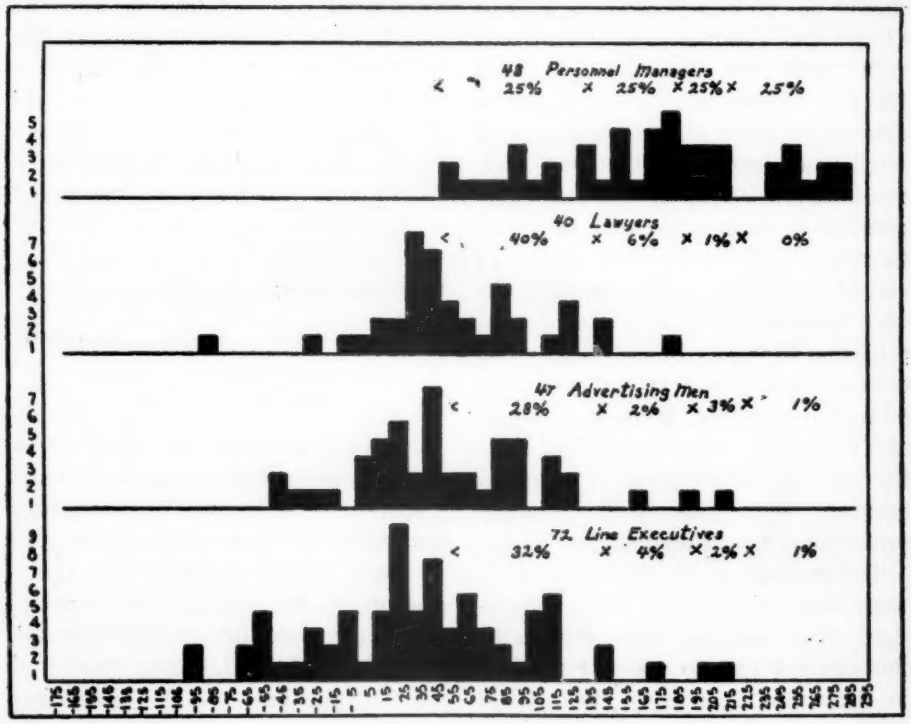



FIG. 2. DISTRIBUTION OF SCORES OF 48 PERSONNEL MANAGERS WHEN RATED FOR INTEREST IN 13 DIFFERENT OCCUPATIONS

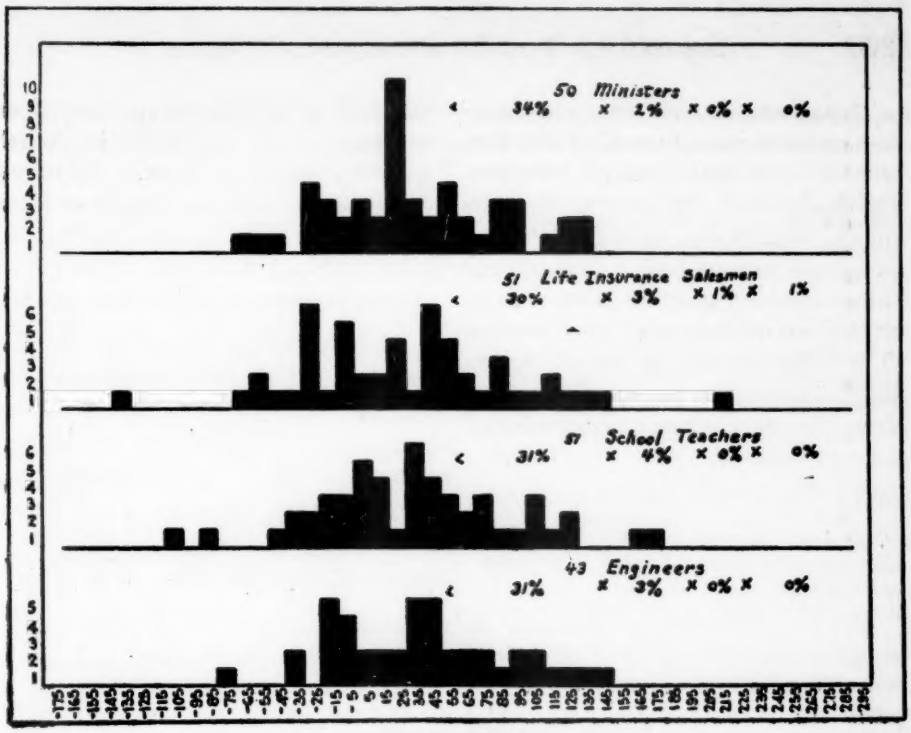



FIG. 2. Part 2

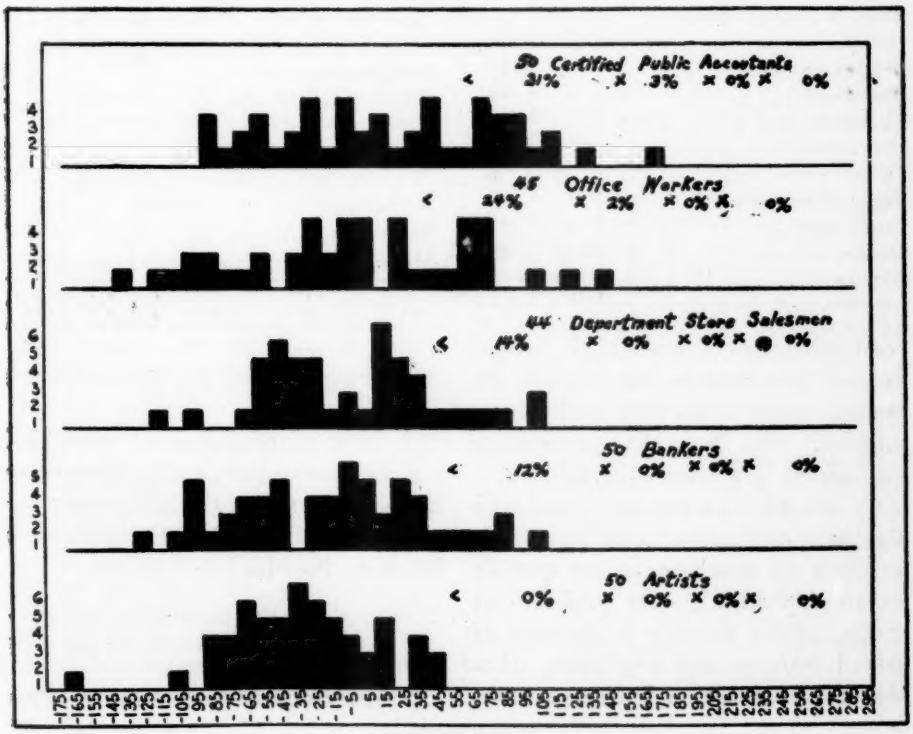



FIG. 2. Part 3

How do these men from other professions who rate *A* or *B* on the Personnel Scale rank in their own professional work? We may answer this query roughly by saying that non-personnel men scoring *A* in personnel fall on the average in the 2.5th quarter of their own profession; those scoring *B* in Personnel fall on the average in the 2.6th quarter of their own profession. In other words a non-personnel man who rates *A* or *B* in Personnel Interest receives on the average the median score in his own professional interest. The data for the separate professions are shown in table 2.

TABLE 1

| | PERSONNEL INTEREST RATING | | TOTAL OVERLAPPING |
|---|---|---|---|
| | *A* | *B* | |
| | *per cent* | *per cent* | *per cent* |
| Lawyers | 7 | 40 | 47 |
| Advertising agency men | 6 | 38 | 44 |
| Line executives | 7 | 32 | 39 |
| Ministers | 2 | 34 | 36 |
| Life insurance salesmen | 5 | 30 | 35 |
| School teachers | 4 | 31 | 35 |
| Engineers | 3 | 31 | 34 |
| Certified public accountants | 3 | 31 | 34 |
| Office employees | 2 | 24 | 26 |
| Department store salesmen | 0 | 14 | 14 |
| Bankers | 0 | 12 | 12 |
| Artists | 0 | 0 | 0 |

On the whole, a non-personnel man scoring *A* or *B* in personnel interest is as likely to come from one quarter as another in his own professional group, except possibly in the case of school teachers and engineers. If a teacher he is more likely to come from the first or second quarter and if an engineer, from the third or fourth quarter, than the reverse. But only a few cases are involved in any of these sub-groups.

### DEVELOPMENT OF PERSONNEL SCALE

The procedure employed in the development of the personnel scale for measuring interest in that occupation is as follows:

TABLE 2

| | AVERAGE QUARTER SCORE IN OWN PROFESSIONAL INTERESTS | |
|---|---|---|
| | Those rating *A* in Personnel Interest | Those rating *B* in Personnel Interest |
| | *quarter* | *quarter* |
| Lawyers | 3.2 | 2.5 |
| Advertising men | 2.7 | 2.3 |
| Line executives | 2.6 | 2.6 |
| Ministers | 2.5 | 2.8 |
| Life insurance salesmen | 2.2 | 2.3 |
| School teachers | 2.0 | 2.1 |
| Engineers | 3.5 | 3.5 |
| Certified public accountants | 1.7 | 2.6 |
| Office workers | 2.5 | 2.4 |
| Department store salesmen | | 2.7 |
| Bankers | | 3.3 |
| Artists | | |
| Average | 2.5 | 2.6 |

1. The percentages of personnel managers who like, are indifferent to and dislike each of the 263 items were obtained. Thus, for the first five items on the blank:

> 49 per cent like to be an actor, 38 per cent are indifferent, 13 per cent dislike it
>
> 59 per cent like to be an architect, 30 per

cent are indifferent, 11 per cent dislike it

36 per cent like to be an army officer, 32 cent are indifferent, 32 per cent dislike it

47 per cent like to be an artist, 34 per cent are indifferent, 19 per cent dislike it

27 per cent like to be an astronomer, 60 per cent are indifferent; 13 per cent dislike it

2. The percentages of men from eighteen[3] occupations who like, are indifferent to and dislike each of the items were obtained. Thus:

38 per cent like to be an actor, 35 per cent are indifferent, 27 per cent dislike it

50 per cent like to be an architect, 36 per cent are indifferent, 14 per cent dislike it

26 per cent like to be an army officer, 34 per cent are indifferent, 40 per cent dislike it

41 per cent like to be an artist, 38 per cent are indifferent, 21 per cent dislike it

35 per cent like to be an astronomer, 45 per cent are indifferent, 20 per cent dislike it

3. The differences between these two sets of figures were obtained:

| | | | |
|---|---|---|---|
| Actor..... | L+11 | I +3 | D−14 |
| Architect..... | L +9 | I −6 | D −3 |
| Army officer.. | L+10 | I −2 | D −8 |
| Artist..... | L +6 | I −4 | D −2 |
| Astronomer.. | L −8 | I+15 | D −7 |

4. These differences could be used as the basis of a personnel scale. Instead they have been replaced by smaller figures,[4] as follows:

| | | | |
|---|---|---|---|
| Actor..... | L +2 | I +1 | D −3 |
| Architect..... | L +2 | I −1 | D −1 |

[3] Theoretically the percentages of men from the seventeen non-personnel occupations should have been calculated. But by comparing each occupation with the average of all eighteen a great deal of labor was saved and not very much accuracy lost, What inaccuracy was caused in this way reduces the diagnostic value of the test to that extent.

[4] Cowdery determined a weighted score for each response by means of "a modification of the technique of obtaining multiple regression equation coefficients. This method of obtaining close approximation to the best values was worked out by Dr. T. L. Kelley. The weighted score $b$ is obtained by the formula $b = \frac{\phi}{(1-\phi^2)\sigma}$ where $\phi$ is the coefficient of correlation for the fourfold table, the formula being $\phi = \frac{ad - bc}{\sqrt{(a+c)\ (b+d)\ (a+b)\ (c+d)}}$ and where the four fold table contains the number of responses given to an item by a group of members of a profession on one row and by non-members of that profession on the other row." In order to use this procedure Cowdery had to dichotomize the two rows of three items which in some cases did not give, according to the writer, appropriate scores. In endeavoring to save the time necessary to calculate the $b$ weighting for several thousand cases, the writer discovered that there exists a nearly straight line relationship between the $b$ scores and the differences between the percentages of the profession in question and the percentages of all the professions. This straight line relationship holds very well if either, or both, of the percentages are between 8 per cent and 92 per cent inclusive. Within those limits differences of 0 to 2 are weighted 0; 3 to 7 are weighted 1; 8 to 11, 2; 12 to 15, 3; 16 to 20, 4; etc. If either of the percentages is between 0 and 2 or 98 and 100 inclusive, the differences are weighted as follows: 0,0; 1,1; 2 to 3, 2; 4 to 6, 3; 7 to 10, 4; 11 to 14, 5; 15 to 18, 6; etc. An intermediate set of weights are necessary if either percentage is between 3 and 7 or 93 and 97. Use of this table possibly introduces a slight error in some cases but the great saving in time makes possible the calculation of many more data.

| | | | | | |
|---|---|---|---|---|---|
| Army officer | L | +2 | I | 0 | D −2 |
| Artist | L | +1 | I | −1 | D 0 |
| Astronomer | L | −2 | I | +3 | D −1 |

Such a set of figures constitutes our scale for personnel interest. The corresponding scale for artists is:

| | | | | | |
|---|---|---|---|---|---|
| Actor | L | +2 | I | −1 | D −1 |
| Architect | L | +6 | I | −4 | D −2 |
| Army officer | L | −3 | I | +2 | D +1 |
| Artist | L | +19 | I | −11 | D −7 |
| Astronomer | L | +2 | I | +1 | D −3 |

Such is the appearance of two of our scales.

5. An individual record is scored by the use of one of these scales. As an example the personnel manager who scored highest in personnel interest marked the first five items on his blank as follows:

| | | | |
|---|---|---|---|
| Actor | L | I | D |
| Architect | L | I | D |
| Army officer | L | I | D |
| Artist | L | I | D |
| Astronomer | L | I | D |

Using the personnel scale he would be given +2 on the first item, −1 on the second, +2 on the third, 0 on the fourth, and −1 on the fifth, a total of +2 for the five. He obtained a total score of 285 from the 263 items. Using the artist scale he would be given −1 on the first item, −2 on the second, −3 on the third, −7 on the fourth and −3 on the fifth, a total of −16 for the five. He scored −236, making him 45th among the 48 personnel managers as far as interest in the work of an artist is concerned.

The greatest disadvantage of the test at the present time is the fact that it requires about 12 minutes to score a blank for one occupation or about two and a half hours for twelve occupations. Only three persons have achieved a greater speed in scoring papers than this and no one can keep at the work for more than two hours at a stretch due to eye strain. It seems from a survey of the data that it will be possible eventually to group occupations and to score a blank first for these group classifications and later for the several occupations within the group. Even this will require a great deal of time. But if it is ever possible to assign a man to the occupation where he will be most successful and happy the time necessary to determine this fact will be well spent.

### SOME ASSUMPTIONS

How is it possible that a test of this sort in which a person merely records likes and dislikes can determine his occupation? The writer is concerned at the present time in determining the practical limits of this test and is not attempting to answer any such question as the above. But there is a good deal of fascination in speculation. Possibly what follows may suggest a better explanation to someone or start experimentation on phases of this problem. If so this section will have served its purpose.

1. Assume there are $n$ "traits" (total number of factors affecting fitness in all vocations). Assume that each trait may vary from 0 to maximum (or possibly from minus through zero to plus) and that these traits correlate with each other from −1.00 to +1.00.

2. Assume that in any vocational environment certain traits must be employed and that other traits are not

employed. For example, fine finger manipulation is necessary in dentistry but not in the ministry.

3. Assume that "liking" and "disliking" are rough indicators of what one does easily or with difficulty, or of what brings satisfaction or dissatisfaction.

4. Assume that one likes a vocation in which his well developed traits may function and in which his poorly developed traits are not forced to function.

5. Assume that man tends to remain in a vocation he likes and tends to leave that profession he does not like for one he imagines he will like. Factors such as education, prolonged period of infancy, travel, freedom to shift from one occupation to another all aid man in finding an occupation to his liking. Necessity to earn a living, tendency to get into a rut and stay there, etc., tend to prevent man from finding his proper profession.

6. All these assumptions once granted, it seems theoretically possible to assume that the summary of likes and dislikes of men in a given occupation represents a summary measure of their "traits." Also, that this summary is made up largely of traits that must be possessed by one in that occupation and, on the other hand, does not include many other traits. For example, in the summary for ministers there must be considerable weighting due to the "trait" of liking to appear before an audience but not to that of using fine finger manipulation or of liking mathematics. But it is not necessary to know what these traits are in order to classify men on the basis of one totality or another.

In the past, efforts in vocational guidance have been largely directed toward determining the abilities essential to success in an occupation and the preparing of tests to measure these assumed abilities. Comparatively little has resulted from all this effort. It is suggested that we try the opposite attack on this problem. Let us disregard the abilities for the time being and concentrate on measuring the totality of mind set under given conditions. It is most probable that as data accumulate light will be thrown on the first question. Chemistry developed into a great science before the constituents of an atom were ascertained.

It must be admitted that lack of knowledge makes it difficult to develop a perfect test. One cannot know whether one item on the blank measures one or many traits, nor whether two items measure different traits or the same trait. It is quite possible that some traits are measured many times and that some other traits are not measured at all. Trial and error procedure will, however, lead eventually to a far better understanding of the whole situation.

*(Manuscript received June 9, 1926)*

# Value of Student Interviews

By E. L. Clark, *Northwestern University*

*How valuable are data obtained in a personal interview? Two important methods of validating such data are to compare material on the same topic obtained by several interviewers, and to compare the interviewer's data with objective facts. Both of these methods are applied to college personnel work by Mr. Clark, with results which demonstrate the subjectivity of information obtained under the described conditions.*

IN ORDER to get some estimate of the value of the data being obtained at Northwestern University by student interviews the following two studies were made. The first of these seeks to uncover differences in the data which are due to the interviewer himself. The second study is concerned with the problem of the validity of the estimates and opinions of the interviewer which are made on a basis of the facts available.

The material used for the first study was the time distributions of freshmen. These distributions were made out in interview with the individual students by the two interviewers, *C* and *D*. A part of the procedure of the interview was to account for the 168 hours of the week by the items of the time distribution. Before interviewing started and while it was in progress the interviewers often discussed the meaning of each item. Thus there was supposedly complete agreement as to what should be included under each. Furthermore, the students were taken alternately by the interviewers as they came in. So far as is known there was no selective factor operative for one interviewer which was not present also for the other interviewer. (About fifteen students usually came on the days on which interviewing was done. Both interviewers worked and took the men as they came.) During the semester *C* interviewed 98 freshman men and *D* 95. These 193 interviews were the source of the data of this first study.

On page 205 are given the average amounts of time spent by the students interviewed by each interviewer on each item of the time distribution.

The 90 odd time distributions of each interviewer were twice divided into three groups of about thirty each. Once this division was made by chance and the other time it was made so that those students dropping out of school at the end of the year comprised one of the three groups. This made it possible to compare the data obtained by the two interviewers by fourteen com-

| | AVERAGE NUMBER OF HOURS SPENT BY *D*'S STUDENTS | AVERAGE NUMBER OF HOURS SPENT BY *C*'S STUDENTS |
|---|---|---|
| Athletics: | | |
| Intercollegiate | 1.94 | 0.09 |
| Intra-mural | 0.44 | 1.57 |
| Exercise | 2.35 | 3.88 |
| Publications | 0.55 | 0.55 |
| Dramatics, Debate and Music | 0.64 | 0.12 |
| Other Campus Activities | 0.34 | 0.12 |
| Social: | | |
| Campus Affairs | 5.20 | 3.28 |
| Outside Affairs | 6.70 | 5.17 |
| Fraternity Duties | 2.04 | 2.00 |
| Outside Work for Compensation | 11.60 | 7.80 |
| Sleep | 54.40 | 55.25 |
| Meals | 10.60 | 11.24 |
| Transportation | 12.10 | 8.50 |
| Leisure and Miscellaneous | 14.80 | 23.20 |
| Class and Laboratory | 17.45 | 18.80 |
| Study | 26.40 | 25.80 |

parisons of averages, besides the comparisons of the two grand averages shown above.

These comparisons of the averages of groups may be taken as a check upon the differences found in the averages above. If differences of the same type as those above are found in the parts we may accept them as being consistent differences. A comparison of the groups of 30 shows the same type of differences as is shown above in each of the fourteen comparisons for the following items: Athletics Intercollegiate, Athletics Intra-mural, Exercise, Social Campus Affairs, Transportation, Leisure and Miscellaneous, and Class and Laboratory. Since all possible comparisons of groups are consistent in showing one kind of difference, it is likely that the differences shown by these items are significant. Other Campus Activities and Social Outside Affairs should perhaps be included in the group above, for in each of these items there was only one comparison in which an average of one of *C*'s groups exceeds one of *D*'s groups. In Dramatics, Debate and Music and in Outside Work for Compensation there are only two cases in which *C*'s group or groups are higher. The above comparison may be taken to show that there are real differences in the data obtained by two interviewers from unselected groups of students within one class.

Several reasons suggest themselves as explanations for the above differences. The first is that the two interviewers did not have in mind exactly the same definitions of the items. Although there was an attempt to be uniform in this regard the great number of things which the students did made it difficult to mention and remember the classification of all types of activity. A second cause of difference was the well-nigh unavoidable suggestions which the interviewer gave the students. As the students were not in the habit of thinking of their day as being divided according to the classification here used, it was extremely hard for the interviewer to get estimates on all items. To stimulate responses he sometimes resorted to suggestions, and the resulting data were probably somewhat different because of the preconceived notions of the interviewers. (Interviewer *D* had recently been in athletics on the Northwestern campus and *C*, who had not been in athletics,

was from another college.) A third factor was the unwillingness of a few students to state sincerely what they thought they were doing. When the interviewer suspected a student was trying to deceive he set about to forestall it. Here again the interviewer's idea of the actual manner in which students distribute their time probably had a bearing on the results obtained.

As a basis for the second study two interviewers, *F* and *C*, made estimates as to the probable point average of the students at the end of the then current semester. The interviews were conducted during the second half of the first semester giving the interviewers, in addition to the test scores and high school standing, an opportunity to get from the student an opinion as to how he was getting along in his work. Using all facts available, the interviewers made their estimates of the probable scholastic average of each individual. The estimates were made in terms of point average where 3.00 meant the highest possible (*A*) average, 2.00 exactly a *B* average, 1.00 a *C*, 0.00 a *D*, −1.00 an *E*, and −2.00 an *F* average. The grades *D*, *E*, and *F* are unsatisfactory grades although some *D* grade work may be used for graduation.

The estimates of interviewer *F* gave a coefficient of correlation of 0.66 with the actual point averages received on the semester's work. The estimates of interviewer *C* gave a correlation of 0.73. The mean of *F*'s estimates was 1.3575 and the mean of the actual averages of his group was 0.8748. His estimates were then 0.4827 higher than the actual grades—this is more than $\frac{1}{10}$ of the range of grades made. The mean of *C*'s estimates was 1.0800 and that of the grades made 0.8605. These estimates were tnen too high by 0.2195—about $\frac{1}{22}$ of the range too high.

These coefficients of correlation and statements of the means of the estimates do not indicate all of the facts concerning the estimates. While the estimates were generally somewhat higher than the grades made, they were not higher throughout the entire range of point averages. Of those students making 2.00 or better only one of twenty was given an estimate higher than the grades actually made. At the lower end of the range, for those making a minus average, the tendency to overestimate was much greater than the tendency to underestimate mentioned above. In this group only one of thirty-four was underestimated and this one only slightly so. This overestimating in the lower ranges and underestimating in the extreme upper ranges causes the estimates to be much more bunched near the center than are the actual point averages. The standard deviation of the estimates was only 0.6675, while that of the point averages was 0.9250.

The estimates, then, are not only higher generally than the grades made, but are bunched much more about the central tendency. The interviewers show a fear of estimating extremely high and of estimating extremely or even fairly low. Overestimating the low students is partially due to the fact that the estimates are to some extent a reflection of the hopes and estimates of the students themselves.

In summarizing it may be said that there appears to be a real likelihood that differences in data may be due to the interviewers. These differences may appear even when the interviewers are working with each other in an effort to conduct uniform interviews. The data further indicate that the interviewers can be considerably in error in judging factors for which tangible predictive data are available. These studies point to the necessity of taking into consideration the influence of the interviewer on the data obtained.

(*Manuscript received June 7, 1926.*)

# Book Reviews

## MAINSPRINGS OF MEN

*By Whiting Williams, New York: Charles Scribner's Sons, 1925. Pp. vi + 313*

REVIEWED BY ARTHUR W. KORNHAUSER

Here is a book which every personnel man should read. He will then urge all his brother executives to read it also. It is not a scholarly work—but it is gloriously human and effective. It deals with men and what they want—particularly what they want in their work. There are few new facts; but there are insight and interpretation which turn the facts into a challenge. The stimulation, moreover, does not leave one with a vague sense that something should be done; it suggests possibilities definite enough to be shaped shortly into plans of action.

The book is an outgrowth of the author's experiences and observations as a laborer in "steel-plants, coal-mines, ship-yards, and round-houses." Descriptions of these months of work have been given in greater detail in earlier volumes. The present chapters represent a more generalized and unified interpretation of outstanding and abiding impressions.

One single conviction sounds and resounds through the book. In brief it is this: Men are fundamentally moved by the craving for recognition, the desire to count, the wish to be worth while. "The prime influence on all of us today is our wish to enjoy the feeling of our worth as persons among persons." The particular significance of this for industry, Williams states as follows: "Nothing can be of greater importance to industrialized America than this: that for practically all of us here, work represents this point where our wish to believe in ourselves encounters most easily the readiness of others to add their belief to ours."

Chapters on wages, working conditions, unions, and employers all lead to the same conclusion—the important factors in each instance are those influences which affect the worker's status relative to others, his self-respect, his feeling of accomplishment. "What every worker knows is this: that sooner of later the final joy of his work is settled, not by him nor by his employer, but by the social standing awarded him by his fellow citizens." A supplementary conclusion runs thus: "Everywhere among the workers a man determines the social standing of himself and his family, not so much by the earning power as by the *nature* of his job." The tools used, the value of the product, the skill required, the responsibility, the amount of unemployment—these and a score of like factors determine the level of the job and of the man who holds the job. Union organizers and employers are successful largely to the extent that they guarantee and protect the working conditions which determine the status of their workers.

Part II extends the conception of the "mainspring" and shows its workings in every phase of our lives. It includes interesting discussions of inferiority feelings and the place of rationalization, leadership, the rôle of emotions, some aspects of fatigue, and so on.

Part III of the book is concerned with "what we can do about it." The way to better industrial relations will not be

traveled "unless all those who work together can somehow enjoy together the feeling of their partnership in the common enterprise. And this will be impossible, in turn, unless those who work together enjoy together the fullest understanding of each other, and of the undertaking through which they render their contribution and gain their reward." Pages of stimulating detail give life to this statement (as, indeed, to all the generalizations which in themselves are not striking). The need and possibilities of informing workers and arousing interest, of removing fears and grievances, of engaging in true coöperative work, are alluringly portrayed.

The book as a whole is an extended and popularly written essay; it is not a scientific treatise. The chief departure from popular style lies in the fact that each chapter is followed by several pages of concrete thought-provoking problems and a list of well-chosen references. Illustrative situations and scraps of conversation are used in great profusion. The author does not examine the pros and cons of the problems; he defends a position. He has developed a firm conviction that labor's wants and needs can be and should be properly satisfied under our present economic organization. The roots of labor problems are personal feelings and attitudes which can be changed; they do not represent fundamental conflicts of interest or inevitable effects of modern industrial life. Williams is an optimist. He is also intensely human. The book reflects these views and temperamental reactions quite as much as it does the facts. Perhaps that is why it takes hold of one; perhaps we feel that the spirit it represents will go far toward re-molding our industrial society.

As a psychological analysis of motives the book leaves much to be desired. No one can doubt the importance and widespreadness of the craving for recognition, but Williams leaves one vaguely uneasy about all the other urges to action which he has not mentioned. The whole treatment is over-simplified. The "mainspring" itself is surely a whole category of impulses and desires, among which the variations may be as important as the uniformities. Moreover, there are other parallel groups of motives the omission of which leaves a very fragmentary picture—sex impulses, desires for rest and comfort, fears, hatreds, disgusts, tendencies to avoid pain, and so on. The "why" of human conduct is not to be dealt with by any one set of dynamic factors, however important these may be.

## A PSYCHOLOGICAL STUDY OF IMMIGRANT CHILDREN AT ELLIS ISLAND

*By Bertha M. Boody. Baltimore: The Williams & Wilkins Co., 1926. Pp. 163.*

REVIEWED BY C. S. YOAKUM

This small volume gives a compact summary of the laws relating to immigration, of studies previously made of the mental status of immigrants, and a short experimental study of a group of immigrant children. An unusually complete set of footnotes and comments add to the value of the summaries.

The book represents two values. In the first place, its short and relatively complete story of immigration development pictures to the reader a point of view that counterbalances the ignorance of the process of entry and of the peoples who enter so prevalent among users of foreign labor and more favorably situated social groups. Secondly, it reaches, in the face of insufficient evidence it is true, a sound conclusion that progress in method of examination and legal enactment have depended on each other. Regardless of pressure of all sorts, the author believes that our government

has moved along the lines of scientific knowledge whenever science has had any real aids to offer.

In summarizing the short experimental study, the author remarks, "In any one test, or in the case of one individual as compared to another, there may be apparent distinctions; but as the study goes on, day after day, the records as far as 'race' is concerned, seem to even themselves." Valuable comments on the usefulness of a variety of tests and test methods are contained in the chapter giving the experimental study.

The title is somewhat misleading. A large portion of the book is given over to legal phases of the immigration problem. Naturally neither phase is treated exhaustively. Notwithstanding these limitations the book brings together in small compass a wealth of scattered information on an important problem.

# Abstracts

*Present Limitations of Psychological Tests in Management.* C. S. YOAKUM. American Management Association, New York. Annual Convention Series: 1925, No. 21, pp. 1–14.

There are certain limitations, psychological in nature, that need to be overcome in order to advance the art and science of management. Our knowledge is incomplete. We need to know much more about the dynamics of human nature, the formation of social habits, and the psychology of the growth processes with special reference to those stable and modifiable factors which persist throughout the life cycle. Our methods of research must be refined and extended and provision must be made for expert managers who understand these techniques of science. For the practical purposes of applied psychology we should not allow the theoretical delimitations of the schools of psychology such as behaviorism, structuralism, functionalism and psychoanalysis to restrict us in the selection of techniques and data.

Another difficulty lies in the fact that there are no serviceable cumulative records of present or past performance which afford a basis for scientific investigations. The only data available are gross estimates and opinions which have little scientific value. Furthermore such records as exist are kept on a volume of production or dollar basis and not on a human basis. Personnel accounting must define profit in a new way and must recognize that the individual human worker is the real unit of business and that dollars, pieces of finished product and quality, are relative to the personal factor.

Again there is great difficulty involved in the transfer of techniques and conclusions from laboratory to industrial conditions. This transfer oftentimes means adaptations to larger scale production, manipulation by less skilled workers and other complicating processes.

Frequently the enthusiasm of discovery is confused with the accomplished fact, producing a skepticism which does not give a new device a fair trial. Every real advance in the industrial practice comes through a thorough testing of the new idea. Psychology asks no quarter in this respect.

Finally, there are practical limitations in present day business methods. For example, business methods make criteria and tests independent variables and overlook reliability in the haste to establish validity. Little time and energy is allowed in the average business concern for research and keeping continuous records. There is also a language difficulty involved: the business man has difficulty in understanding the language of the psychologist and the psychologist does not comprehend that of the business man. Finally the manager tends to over-rate his ability to understand others and builds up a belief in his own infallibility of insight which subtly extends itself into making snap judgments of new techniques.

These limitations merely call attention to the nature of the task ahead of management. They are, however, not discouraging, for enough has already been accomplished to give confidence in the existence of a wide field of usefulness for applied psychology in business and industry.

*Experimental Psychology in Personnel Problems.* C. S. YOAKUM. Bulletin of the Taylor Society, June, 1925, Vol. 10, No. 3, pp. 154–163.

The artistic and orderly mind blended in the same person gives us the scientist. The artistic mind observes significant problems in ordinary events, while the orderly mind sifts out the solution to the problem with utmost patience. This is the

problem of the scientist: to feel artistically and justly; to search methodically until the factors that hinder feeling are found and adjusted. Up to this time these two operations have rarely been combined. We must hasten the time when the problems of selecting, working with, and influencing men are no longer merely intuitive but successfully combine art and science.

Early experiments with quantitative analysis in psychology and more recent attempts along the same line are beginning to yield important data for applied psychology. For example Weber's law "that the recognition of the just noticeable difference is dependent entirely upon the relation of the difference to the total value" means practically that triviality and importance of events are not measured by the absolute magnitudes of the events but by the more specific relationships they bear to our appreciation of them. That is, satisfaction with wages and hours within the middle ranges is dependent on what the other fellow gets and how long he works than upon direct understanding of the actual differences in amount or method of payment. Such applications of laws derived in the laboratory along with recognition of the personal equation in observation and recent attempts to study the emotions indicate that the fallacy that psychology cannot become a practical science is rapidly being shattered.

The general problem of the learning curve in acquiring proficiency in industrial processes affords many interesting possibilities for experimentation. The laboratory has furnished much data on the learning curve but little of it has been made available to the shop and the office. We cannot reach standards for capacity for a position, for cost of training, for cost of turnover, for methods of training and for efficiency of supervision without a deeper insight into the meaning of the learning curve.

Again, the problem of turnover presents many interesting opportunities for experimentation. There are already considerable data to indicate that four important elements are responsible for labor turnover. These are (1) adolescent restlessness, (2) differences in individual capacity, (3) social status, and (4) individual interests. These four factors deserve extended study. To test the meaning of adolescent restlessness there is need of detailed and systematically compiled work histories of many individuals. Further research and presentation of data in usable form on the qualities and aptitudes of human individuals is needed by the employment office. A psychological and sociological investigation of the reasons why any particular task obtains a definite social status is desirable. Finally we must distinguish between permanent interests and those dependent on temporary circumstances.

In order to attack these problems we must collect detailed and pertinent statistics with complete descriptions of the conditions out of which the data arose. With a better appreciation of the human factor in industry the problems of turnover, wages, unemployment, etc., are open to solution. This better appreciation necessarily results in the recording of an entirely different series of data than is now customary. It also involves a willingness to experiment.

*The Measurement of the Less Tangible Qualities.* G. B. Watson. Vocational Guidance Magazine, March, 1926. Vol. 4, No. 6, pp. 281–289.

Consists of a "yearly inventory" of the more important developments in tests of human behavior to follow the earlier summaries made by Symonds and May and Hartshorne. It reports work on rating scales and personality traits. Twenty factors conditioning the success of rating scales are listed which have been proved, i.e., "judges having same contact with subject always agree, traits broken up into factors give more reliable estimates, several months warning should precede the making of a rating sheet," etc. Ratings have been proved satisfactory in predicting success of college students, ranks of high school students, success of teachers, and financial success in engineering.

Physiological measures of personality have not been proved successful. The galvanometer shows cheerfulness or depression and may be used for emotionality.

Inspiration ratio has been tried to show truth and falsehood.

Reaction time as an index of interest has been variously used by Burtt, Watson, Landis, Gillette, Jacobson, Woodworth and Pressey.

Questionnaires in the character field have been used for ethical-religious attitudes and for twenty-seven traits and instincts. These include group tests by Pressey, Brotemarkle, Kohs, Hart, Upton and Chassell.

The Downey Will-Temperament test has received a heavy blow in that its reliability has been established at between 0.20 and 0.30.

Information tests relating to character are best represented by Orr's test of good manners, Gates and Strang's test of health-knowledge, and Schwesinger's test of social ethical vocabulary.

Ratings of backgrounds have been developed by Whittier for homes and neighborhoods and by Chapman and Sims for social-economic status.

There are three new interest tests: Freyd's interest items, Travis' preference for traits, and Myerson's multiple choice to distinguish types of conversation reaction.

Social-economic attitudes are covered in Harper's test of the social attitude of teachers, Sturges' militarism-pacifism test, and Bogardus' "Social Distance Test."

There are two new mental hygiene questionnaires: The Colgate "Mental Hygiene Test" and Chassell's emotional history record.

An important study concerning studiousness is a time record arranged by May.

One may conclude: Rating scales are again coming forward and showing better results than most tests. The test field shows much life and ingenuity but little study of validity and reliability, so that more rigid criteria are needed before tests are published. And most important, subjects are found to be able to raise scores if the purpose of the test is known; something must be done to insure the tests against this in future.

*More Pay and Less Work.* WILLIAM T. FOSTER and WADDILL CATCHINGS. American Federationist, January, 1926, Vol. 33, No. 1, pp. 35–44.

States chief economic problem: Why is it not possible with all our natural resources, capital equipment, labor saving inventions and technical efficiency, to gain more pay with less work?

The answer is because we do not use our vast production resources at any approach to capacity. We do not approach capacity because we cannot sell goods at prices which make continued production possible. People who would buy do not have sufficient incomes. Incomes are not sufficient because, first, financial processes whereby goods are produced for sale at a money profit do not yield to consumers enough money to buy the goods; second, under the impelling necessity of saving, they cannot spend as much as they receive.

Since under consumption is the chief cause of our troubles, adequate consumer income is the chief remedy. Solution to inadequacy of incomes must be built upon present economic foundations, but it must first be agreed by all that this problem exists.

It is an unquestioned fact that the entire country suffers from chronic underproduction. Industrial engineers concluded that output could be increased fifty per cent with an eight hour working day if incentives were sufficient to cause employers and employees to do their best. This was proved during the World War.

The depression of 1921 was due to underconsumption. Consumption regulates production. The common view that this business depression was caused by a consumer's strike is nonsense. People who refuse to buy because they have no money should be compared with unemployed rather than with strikers.

Rapid growth of sales on the installment plan proves that people can produce faster than they can buy and pay for.

The cause of deficiency in flow of money to consumers is based on the fact that industry has no source of income except consumers, and consumers have no source of income except industry. Money used by employer to enlarge business takes just so much from consumer. Even though all

money was turned back to consumer there would be underconsumption because consumer must save. Money saved and invested only causes an increase in output which is not consumed.

Conclusion: If to the highly efficient system which now provides money for production, we could add an equally efficient system for providing money for consumption, we could make rapid progress toward realizing the potential output of labor and capital. A better financial organization of society would bring higher real wages. More leisure in which to enjoy those incomes is also necessary.

"More pay and less work" is futile in so far as we strive to attain that end merely by forcing up money wages or by limiting output. It need not be futile if we strive to attain that end, first, by finding out exactly why we never long succeed, as consumers, in acquiring money enough to buy all the wealth which, as producers, we are perfectly able to produce; and, second, by taking measures to offset this deficiency in consumer income.

*Industry Prevents and Remedies Workers' Eye Defects.* JAMES W. SMITH. The Nation's Health, Nov. 15, 1925, Vol. 7, No. 11, pp. 729–731.

Reports results of a systematic examination of workers' eyesight with the purpose of increasing efficiency.

Following the close of the World War, more attention has been paid to the general health of workers in industrial occupations.

Probably no organs are more abused than the eyes. But 50 per cent of workers in industrial fields possess normal vision.

Poor vision is the cause of many accidents in plants. The idea is to eliminate these accidents and to increase efficiency by correcting one of the basic causes.

Through the coöperation of the Electrical Testing Laboratories in New York, the employees were examined in 1920 and checked up every year thereafter. The laboratory was chosen because the work carried on there is of a character usually considered to be productive of eye strain. Numerous complaints had been made by the employees that the work was trying and productive of eye strain. The object was to ascertain the cause of the eye complaints, to correct it if possible, and then to observe what percentage of workers could be maintained in normal ocular health.

A simple dark room was improvised; detailed information was obtained from each employee examined; and a complete ophthalmological examination was made and glasses prescribed if required.

Fifty-nine per cent of the 87 employees were laboring under the handicap of some ocular or visual defect.

The laboratories accepted the ruling of the opthalmologist that applicants be examined before acceptance.

The workers examined in 1920 were reexamined in 1922, 1923, 1924, and 1925. A marked decrease in the percentage that required subsequent treatment was shown.

The return to the employer in increased efficiency more than offset the cost to him of the examinations by a trained eye specialist.

Workers coöperated when they realized that the physician aimed to help them by bettering vision or by recommending transfer to work involving less eye effort.

Many cases of poor work or discontent were traced to poor eyesight and were relieved by treatment.

No worker skilled or unskilled should be accepted for employment without an examination to determine his visual acuity; this is a safeguard to both the employer and employee.

Industrial concerns availing themselves of periodic eye examinations will find a better morale among their personnel and a more efficient working organization.

*The Human Side of How to do It Best.* A. W. SANDERS. Journal of Industrial Hygiene, December, 1925, Vol. 7, No. 12, pp. 559–566.

Doing things means expending energy and this leads to fatigue. This is more appreciated in work than in play because the mind is more easily influenced when it is depressed. Fatigue is the all-important phenomenon which interests the industrial psychologist. It results from muscular or nervous effort and while local at first,

becomes general when these efforts are sustained. Fatigue is a sort of intoxication which incapacitates man. To prevent this incapacitation is the aim of the industrial psychologist.

There exist both healthy and unhealthy fatigue, and the all-important question is when and for what reason does healthy fatigue become unhealthy and injurious. In general, it becomes injurious when localized fatigue begins to spread and affect the nerve-centers. The indirect method of reducing fatigue—by applying industrial psychology through motion and fatigue study, changing the movements or relative position, or harmonizing surroundings of workers—must be the first line of attack.

Different types of industrial fatigue may be grouped as follows: (1) Due to work done for which worker is temperamentally unfit, (2) due to making unnecessary motions, (3) caused by unsympathetic surroundings. Methods of fatigue elimination in industry are as follows:

*I. Vocational Selection.* This is suggested by the first type of industrial fatigue. The nervous system of one man offers more resistance to the same kind of excitation than that of another. Once it is known which kind of nervous excitation offers least resistance one characteristic is found for the work for which the man is most suited. What characteristics can be defined in such a way? Most important is concentration of mind.

*II. Motion Study.* Can be applied in every industry where processes involve the quick repetition of movements on the part of the worker. Cost of the change from an old to a new system is almost usually infinitesimal. Girls working in a knitting factory had to move a handle fastened to a saddle arrangement, thus moving the saddle. To do this they had to move the upper part of the body in harmony with the movement of the saddle. To be able to sway, the feet were placed about eighteen inches apart. But to support the body with the least fatigue the angle between the floor and leg must be almost ninety degrees. With feet apart the angle was about eighty-four degrees. The workers were given slightly sloped planks, restoring the angle to ninety degrees, and fatigue was diminished and production increased.

*III. Harmonizing the Surroundings.* The third type of fatigue is due to outside surroundings such as great noise, fear of getting hurt, bad atmosphere, etc. Remedies are not always easy here because conditions are sometimes difficult to alter. Those who apply industrial psychology to processes must have great patience because they are bound to come into almost immediate contact with habit.

Conclusion: The aim of business is to sell something for more than it has cost, and the chief problem is to lower costs without lowering wages. Industrial Psychology can help to attain this end. It can lower the human energy required to do work, thereby decreasing the time required in production. Its application benefits equally the worker and employer. It is the first step in humanizing industry.

*The Competitive Consciousness.* I. C. WHITTEMORE. Journal of Abnormal and Social Psychology, April, 1925, Vol. 20, No. 1, pp. 17–33.

The subjects of the experiment, seventeen in number, of whom thirteen were men and four women, ranged in age from eighteen to fifty-five years. The average age was 26.2 years and the the A. D., 5.0 years. They met twice weekly in groups of four and worked on a task involving the copying of passages from a daily newspaper with rubber letterstamps impressed individually. There were periods of competition and noncompetition followed by introspective accounts.

The conclusions of the study are as follows:

"1. Competition on a task commences with an adjustment period in which the subjects either report (a) a conscious effort to orient themselves to the task, or (b) a conscious attempt to discover their probable position in ability relative to opponents.

2. Competition with the group is less frequent than competition with a particular individual. A subject tends to pick out as a rival that person most nearly equal in skill.

3. Autocompetition plays a large part in the competitive efforts of all subjects; it plays the principal part with some.

4. The consciousness of competitive effort is rather in the nature of a recognized attitude than an immediate awareness.

5. In most cases the competitive spirit rises during the period of adjustment. It dies out in the long run.

6. Elements of the competitive attitude sometimes carry over into noncompetitive periods of work. There are no signs of a rise in productivity corresponding to this persistence.

7. The subject matter of consciousness during competition includes irrelevant ideas, awareness of autocompetitive effort, and sociocompetitive references. The proportion of irrelevant ideas is higher in competition than in noncompetition.

8. A social situation relieves the boredom of a simple task oft repeated.

9. About as many subjects prefer noncompetitive as competitive work. There is no relation between preference and success.

10. There is some evidence that most subjects undergo physiological changes leading to a rise in blood pressure during periods of competition."

*"We Now Face the Problem of Mexican Immigration."* T. N. CARVER. American Bankers Association Journal, April, 1926, Vol. 18, No. 10, pp. 692–718.

Mexico's immigration problem is the opposite of ours. The situation confronting us is one that develops between neighboring countries where the one has a system of public education directed toward practical ends and the other no universal system.

Prosperity is usually followed by large increases in population, viz., England after the Industrial Revolution, Egypt, etc. In the United States, after the World War, instead of an increase in population, we find an increase in the standard of living.

Mexican immigrants are of the lower class and do not bring any capital with them. Peons like to come to this country because of higher wages and higher scale of living. Some employers, wishing cheap labor, would like to have them come. They would work for lower wages. Low wages would produce general poverty in the country. Either education must be fostered in Mexico or else restrictive immigration methods must be employed to keep our present standard of living.

*The Manufacture of Men.* G. L. GARDINER. Nation's Business, March, 1926, Vol. 14, No. 3, pp. 25–27.

Foremen represent the company to the employees, and are really part of the management placed among the workers. The employees judge the company by its foremen. The foreman stands just one step above the workers. He supervises, recommends discipline and promotion, teaches new men and carries out the company's aims and plans. A foreman influences about four times as many people as he has directly under him. He may be the cause for a worker's either liking or disliking his job. A foreman must have breadth of viewpoint. He must understand all processes in the plant in order to be able to consider all aspects of a situation.

Formerly foremen were expected to just happen. Most foremen have ability to do the work but they can't get other men to do it as well. They are more likely to fail through lack of knowledge than through lack of skill. At the Oakland plant foremen are divided into conference groups which meet for an hour and a quarter each week. Here foremen learn self-expression and logical thinking. The meetings are planned in advance with a study pamphlet given out at the end of each meeting. Foremen learn cost of materials, cost of machinery, cost of labor turnover, etc. This gives them the management's point of view. Instead of one plant manager there are many of them. Foremen take pride in the confidence shown in them.

Foremen may be a company's greatest asset, or its greatest liability.

*Salesmen's Turnover.* E. WHITMORE. Sales Management, February 6, 1926, Vol. 10, No. 3, pp. 166–168, 212.

Gives the types of salesmen one should not hire if turnover is to be reduced. First,

there is the seasonal drifter, the man who has easy money from occupations which take only three or four months out of the year. Second, there is the man who has experienced earning $500 a week in some boom. The third type of man to be avoided is he who follows new industry where he may be the early bird and make a good profit while the work is easy and quit as soon as competition arises.

Going after a salesman is a poor method as it has a bad psychological effect, putting the salesmanager at a disadvantage and making discipline difficult later on.

Two other suggestions made by the author are: (1) Explain fully every detail of any investigation into affairs relating to the salesmen which might hinder their work. (2) Be sold on a man before hiring him, do not hire him "to see what he can do." Abide by the decision and give him support and encouragement and show all possible confidence in him.

*Group Differences in Intelligence Tests.* GRACE E. MANSON. Journal of Applied Psychology, June, 1925, Vol. 9, No. 2, pp. 156–175.

Reports on the relative difficulty of the several types of questions on Bureau of Personnel Research Test VI, as shown by the scores made by eight groups of persons of different ages, educational status, and occupational interests. In all, test records of 341 persons were studied.

To determine the relative difficulty of the six types of questions, account was taken of the speed factor as shown by the number of problems covered, and the inability factor as shown by the number of examples in error and omitted. The statistical measure used was the average percentage of each group.

Discusses the speed factor, relation of number of omissions to number of errors, the relative difficulty of the tests as shown by errors, omissions, and both errors and omissions together, and gives as leading conclusions:

1. That academic groups have been more successful in handling abstract word relations than in handling items of number relation and general information.

2. That other groups have been more successful in solving arithmetic problems and answering general information questions than in the handling of abstract word relations.

3. The order of increasing difficulty for senior mechanical engineering students is: (*a*) true-false, (*b*) number series, (*c*) analogies, (*d*) arithmetic, (*e*) opposites, (*f*) information.

4. The order of increasing difficulty for insurance salesmen is: (*a*) analogies, (*b*) opposites, (*c*) true-false, (*d*) arithmetic, (*e*) number series, (*f*) information.

5. The order of increasing difficulty for minor executives is: (*a*) arithmetic, (*b*) number series, (*c*) information, (*d*) opposites, (*e*) true-false, (*f*) analogies.

States that worthwhile information has been revealed by the study, but that it should be verified by other investigators before it is used in vocational guidance or in industry.

# News Notes

PERSONNEL RESEARCH FEDERATION

*Activities of Member Organizations*

*National Committee for Mental Hygiene*

The National Committee for Mental Hygiene is one of a group of organizations involved in plans for a series of coöperative projects to be undertaken next year, which will have for their basic purposes research and training in the field of extramural mental hygiene. Together they make up a program which calls for the expenditure of nearly half a million dollars for the first year of work and is to be financed entirely by the Commonwealth Fund of New York. The most significant provision of the program is for the establishment of an "Institute for Child Guidance," of which Dr. Lawson G. Lowrey, present Director of the National Committee's Child Guidance Demonstration in Cleveland, will be the Director. The principal aims of the Institute, which is an outgrowth of the experience acquired in the operation of the Commonwealth Fund's program in the field of the prevention of juvenile delinquency during the past four years, will be:

1. To make possible further study and research in the field of mental hygiene for children, with special reference to the causes and methods of treatment of behavior problems.

2. To provide facilities for the training of psychiatrists and graduate psychologists in practical child-guidance work.

3. To provide field training in child guidance for students in psychiatric social work.

4. To afford adequate clinical facilities for the thorough study and treatment of children presenting problems in behavior and mental hygiene.

The Institute will be under the supervision of an administrative Board consisting of Dr. Frankwood E. Williams, Medical Director, National Committee for Mental Hygiene; Porter R. Lee, Director, New York School of Social Work; Everett Kimball, Director, Smith College School for Social Work; Dr. William A. White, Superintendent, St. Elizabeths Hospital, Washington, D. C.; Dr. C. Floyd Haviland, lately Chairman, New York State Hospital Commission; Mildred C. Scoville, Executive Assistant, Commonwealth Fund; Barry C. Smith, General Director, Commonwealth Fund; and three other persons from the social and educational fields still to be appointed.

Other features of the program will be the establishment of (1) a series of fellowships in mental hygiene for the training of additional personnel, to be administered by the National Committee for Mental Hygiene, the New York School for Social Work, and the Smith College School for Social Work; and (2) a field service to be operated by the National Committee for Mental Hygiene which will undertake to provide (*a*) an advisory service to follow up the work of the child-guidance clinics established under the expiring five-year program of demonstration clinics, (*b*) a consultant and organizing service to communities desiring to establish child-guidance work at their own expense, and (*c*) an advisory service to colleges and universities planning mental-hygiene work.

In addition, the National Committee on Visiting Teachers, affiliated with the Public Education Association of New York, which has been conducting demonstrations of visiting teaching throughout the United States, will offer a consultant service to school systems which have established the work permanently following the demonstrations, and to other school systems desiring to establish it. Another organization coöperating in the new program

will be the Joint Committee on Methods of Preventing Delinquency, which has already issued a considerable number of publications based on the work of the Commonwealth Fund in this field in the last four years. This Committee will continue its work and now anticipates the publication, within the next two or three years, of a series of some twenty books, monographs and reports upon the work of the expiring child-guidance program.

The advisory service to colleges and universities planned by the National Committee for Mental Hygiene under this program contemplates the checking of premature attempts at mental-hygiene work in such institutions by means of personal conferences with college presidents, deans and directors of college health departments. The National Committee feels that there is danger, in the present fever of interest in the subject on the part of the colleges, of the adoption of ill-advised plans and the appointment of poorly trained personnel. It has received requests for assistance in the development of mental-hygiene work in the colleges from a considerable number of faculty groups, and the Commonwealth Fund program will enable the Committee to confer with many of these groups, making possible, perhaps, in some instances, the development of adequate plans for sound work where the college is ready for it and the prevention of inadequate work in others. The mental-hygiene program recently announced for Yale University to begin in the fall, is expected to demonstrate how work of this kind can best be carried on in American colleges and universities. This demonstration, which is also to be financed by the Commonwealth Fund, will be under the general control of an advisory committee made up of the following officers and members of the National Committee for Mental Hygiene: Dr. Arthur H. Ruggles of New Haven, Dr. Edward A Strecker of Philadelphia, Dr. Stewart A. Paton of Princeton, and Dr. Frankwood E. Williams of New York.

The New Commonwealth Fund program is characterized by Dr. Williams as probably the most important yet undertaken in extramural mental-hygiene work in the country. The Child Guidance Demonstration Clinics conducted by the National Committee for Mental Hygiene during the past four years, and the fellowships administered concurrently under grants from the Commonwealth Fund, are considered to have laid the groundwork for all of the new subjects and, particularly, to have made possible the adequate staffing of the proposed Institute for Child Guidance.

During this period the National Committee for Mental Hygiene has also been administering a fellowship fund under an appropriation from the Rockefeller Foundation, and last year the Commonwealth Fund made a special grant for the establishment of a three-year course of instruction in psychiatry and psychology leading to the degree of Doctor of Medical Science, at the Graduate School of Medicine of the University of Pennsylvania, for the training of mental-hygiene personnel.

The special importance of these fellowships is seen by the National Committee for Mental Hygiene in connection with the broad general background of knowledge required for work with such social problems as adult criminality, juvenile delinquency, dependency, industrial unrest, difficulties in domestic relations, and other manifestations of social and individual inadequacy, with all of which mental hygiene is vitally concerned. These men, the National Committee feels, are acquiring a point of view with which they will be better able to approach these problems, even if they may not, at the end of their courses, be quite ready to tackle the problems themselves with any immediacy of effort at solution. They are developing an attitude that comprehends and is primarily interested in the dynamic factors of social situations arising from the presence of mental abnormality in the community, as distinguished from the static end-results of these unsolved problems as seen in hospitals for mental diseases and in other institutions.

It is now anticipated, with the inception of the new Commonwealth Fund program, that the way will be open for marked advances both in the direction of developing further needed mental-hygiene personnel

and that of discovering new knowledge and increasingly effective techniques of diagnosis and treatment in the handling of juvenile and adult behavior problems in the community.

The National Committee for Mental Hygiene is also coöperating with the Vocational Bureau of the American Association of Social Workers in the placement of psychiatric social workers. This type of coöperation enables the National Committee to be a factor in maintaining standards of placement in psychiatric social work. The New York School of Social Work sends all its graduates from the course in psychiatric social work to register with the National Committee for Mental Hygiene. Recently the National Committee collaborated with the American Association of Social Workers in the preparation of a special monograph on the "Vocational Aspects of Psychiatric Social Work."

Another coöperative project in which the National Committee for Mental Hygiene has engaged has been the special census of the insane, feebleminded and epileptics recently taken by the Federal Census Bureau, the most comprehensive study of the kind ever undertaken by the Government. The results of the census appear in two monographs issued by the Federal Census Bureau; one entitled "Patients in Hospitals for Mental Disease, 1923," and the other "Feebleminded and Epileptics in Institutions, 1923." Many features of the uniform system of statistics for hospitals for mental diseases and institutions for mental defectives advocated for years by the National Committee for Mental Hygiene have been included in these reports. A significant sequel to this work has been a proposal of the Federal Census Bureau to take the annual census not only of the insane, feebleminded and epileptics, but also with reference to the criminal, delinquent, dependent and other abnormal classes of the population. The proposal has received the approval of Secretary of Commerce Herbert Hoover, who called a conference in Washington last April at which resolutions were adopted formulating the statistical problems involved, and outlining the the plan of work and some of the data to be procured under the plan. These resolutions appear in the July issue of *Mental Hygiene*, quarterly journal of the National Committee for Mental Hygiene.

### THE WOMEN'S COLLEGE IN BROWN UNIVERSITY

Personnel work at the Women's College as such is of very recent origin, though for a number of years a good deal of work of this type has been done in an unorganized way.

Last year the present director, Miss Margaret Davidson, came to the college to start an appointment bureau and to carry on the vocational guidance work that had been done for a number of years by Miss Florence Jackson, who has come to the college two or three times each year.

As soon as the organization of the appointment bureau was started, the need was felt for a much larger and more comprehensive plan, and therefore the various activities have been brought together and all organized under the Personnel Department. The work of the Personnel Department may be divided into four sections:

#### *I. Personnel Work*

*1. Interviews.* Interviews with all freshmen at the beginning and end of their freshman year; interviews with other classmen once a year; additional interviews for special reasons either at the request of the student or the Personnel Director.

*2. Collection and coördination of all information in regard to each student for the use of college faculty and officials.* In connection with this a great deal of time has been spent this year in working out a cumulative record card. This card brings together all the information about a student as she enters college and has place for recording information about her academic, vocational and extra-curricular activities in college.

#### *II. Vocational Advising*

Plans are made for a number of speakers each year to talk in the chapel on various vocations and then stay during the day for interviews with students especially interested in that vocation. There is a reading

shelf in the library where vocational material is kept, and information about various vocations is posted from time to time. The Personnel Director also does a great deal of this work in her interviews.

*III. The Appointment Bureau*

*1. Placement.* a. Placement of Seniors and Alumnae; b. Part-time placement of students wishing to work during the college year; c. Summer placement of students.

*2. Follow-up work.* Letters are sent to the alumnae registered with the Bureau each year and an effort is made to keep all these records up to date. This information is used not only in helping to secure positions for the alumnae, but as a source of vocational information for the students.

*IV. Research*

This will vary from year to year. The particular study this year has been the relationship between psychological test scores and college success and the predictive value for college success of the psychological score and of high school rankings.

The Personnel Department has full charge of these activities, working in close coöperation with, and being directly responsible to, the Dean of the Women's College. There is a Faculty Committee which acts in an advisory capacity. A student committee assists in the publicity and in the vocational guidance work. Next year this committee is to have full charge of the vocational speakers and will arrange for other similar activities. As the work develops there will undoubtedly be certain changes in the details of the organization, and new activities will be added, but it is safe to say that they will all work toward the general idea of the department, which is to secure more individual relations with each student.

RESEARCH ON SLEEP

In 1924 the Simmons Fellowship was founded at Mellon Institute of Industrial Research, University of Pittsburgh, to carry on a broad study of problems in the promotion and maintenance of healthful sleep. Dr. H. M. Johnson and Mr. G. E. Weigand, psychologists, and Dr. T. H. Swan, physical chemist, have been conducting this research during the past year. Recently Dr. Carney Landis, physiologist, has temporarily joined the personnel of the investigation. It is announced that from now on there will be two separate Simmons Fellowships at Mellon Institute. One of them will continue the research on the physiological and psychological factors of sleep under the supervision of Dr. Johnson. The other Fellowship, held by Dr. Swan, will be concerned chiefly with the subject of bedding materials. This investigational work is being supported primarily for the benefit of the public and consequently the experimental results will be published.

PERSONAL ITEMS

Dr. G. H. Miles, Assistant Director of the National Institute of Industrial Psychology of London, lectured in the summer school at Columbia University on *Industrial Psychology in England.*

Dr. Mary H. S. Hayes, Director of the Vocational Service for Juniors, New York City, gave a course entitled, *The Technique of Counselling and Placement,* in the group of summer courses dealing with vocational guidance offered by Teachers College, of Columbia University.

IMPROVING EMPLOYMENT PRACTICE

The editors have received the following communication, giving the experiences of a seasoned personnel executive in introducing scientific methods of employment into his plant.

"Late in 1924 or early in 1925 I had the good fortune to meet Dr. C. S. Yoakum, who would probably never remember the incident. I asked him a number of questions. He left three distinct impressions on my mind, namely: (1) For real scientific selection, psychological tests are indispensable. (2) Their administration must be understood. (3) Their limitations must be appreciated. Since it had been my job to employ and place the new employees of our organization since 1921, and appreciating the fact that I had been doing so with indifferent success, it was no wonder that Dr. Yoakum's comments gave me new hope and with it a new enthusiasm.

I had thought seriously of getting out of personnel work because I could see no beginning and no end. I can see clearly a beginning and so many things to do with so little time to do them, that I am no longer concerned about the future.

"While I had had some courses in psychology during my college days, I decided I needed more instruction before I could begin trying out any psychological tests in employment work. I thereupon enrolled in a course in Mental Testing under Dr. Florence Teagarden of the University of Pittsburgh. Dr. Teagarden recommended a number of books and as I became more interested I purchased and read the following: Psychology for Students of Education —Gates; Fundamentals of Vocational Psychology—Griffiths; Intelligence Testing—Pintner; Psychology from the Standpoint of a Behavourist—Watson; Hiring the Worker—Kelly; Psychology in Business Relations—Snow; How to Measure in Education—McCall; Choosing your Life Work—Rosengarten; Employment Psychology—Link; Organization of Vocational Guidance—Payne; Judging Human Character—Hollingworth. Fortified thus, I made bold to start my initial attempt.

"Before going further, I might say, in passing, that we have on an average 3,000 employees, of whom 500 are women, divided as follows: Male—approximately 450 skilled tradesmen (machinists, 250; toolmakers, 60; electricians, 36; blacksmiths, 5; moulders, 31; patternmakers, 12; pipefitters, 15; stationary engineers, 10; carpenters, 17; bricklayers, 10); 50 apprentice tradesmen, divided proportionately; 150 foremen; 200 clerks and about 1600 unskilled and semi-skilled male workers; female—150 clerks and stenographers, the rest helpers and machine operators in the plant. These classifications of course are made roughly but will suffice to give the reader an idea of our problem. Our labor turnover for the entire plant has varied greatly. The last two years have averaged approximately 50 per cent, previously it ran over 100 per cent.

"Two years is a short time in which to draw many definite conclusions as to just how valuable psychological tests are in employment work. From time to time we do check up with the progress of the employees who were hired as a result of passing scores in the various tests. It would, of course, be absurd to say that in each and every case the test prognostications have been fulfilled. We feel, however, that as times goes on, the correlation between the results of the tests and the future progress of the employees will be found to be high.

"Two years ago we felt the need of a better method of selection more acutely, in the matter of selecting apprentices for the trades mentioned above. On an average, we were losing approximately 10 per cent of our apprentices, principally because these boys did not have the innate mental equipment to learn the trade. Since we have used the psychological tests we have not lost a single boy because he did not have the ability to do the work. We have lost several boys, one because of laziness, another because of dishonesty, and another whose family had moved from the community. Ambition, energy, honesty and virtue are qualities apparently not subject as yet to forecast by way of a test, at any rate by no test with which we are familiar.

"Our first experiment in the use of tests took place in December, 1924. We tried to determine what relationship, if any, general intelligence had to our apprentice trades. We asked the supervisor of apprentices, in coöperation with the various foremen, to rate each apprentice on the basis of the work he was actually doing. He was then placed in one of three divisions, i.e., good, average, poor. We then gave the Otis General Intelligence Examination to the group, 40 in number, and on the basis of the results of these examinations we classified them good, average, poor. We then compared the test results with the foreman's classification and out of the whole number one apprentice who was marked poor on the basis of the Intelligence Test, had been marked good in the opinion of the foreman and the plant supervisor. This one experiment practically sold the use of psychological tests as an aid in selecting apprentices to the plant supervisor, and he has been getting more enthusiastic about them ever since.

"All applicants for trade apprenticeship now take an Otis General Intelligence Test, two Stenquist picture tests and one Stenquist Assembling Test.

"Our supervisor of apprentices states that if the tests had no other purpose than to convey to the public at large the knowledge that all boys applying for an apprentice position have equal chances, that the selection is done on a real and fair competitive basis, and that pull does not count in the selection of boys to learn these trades, their use would be fully justified.

"Our next experiment was in classifying in a similar way 21 clerks. In this we used the Otis General Intelligence Examination, with the Thurstone Employment Test for Clerks. The scores of the psychological tests were then compared with the opinions of the division heads whose judgment was on the knowledge of daily performance. A high correlation was found and as in the selection of trades apprentices, we now feel that we have the machinery pretty well established for the sorting out, as it were, of the best available clerical material.

"In the selection of stenographers we use the Otis General Intelligence Examination, Thurstone's Examination for Clerks, as well as his examination in typing, along with an examination in dictation. Practically all our department heads are satisfied now with our selections. We could not say this several years ago.

"There is a type of employee whose presence in the mill is costly and dangerous. It is that individual who is mentally defective and in addition, whose nervous temperament is such that he allows his imagination to run riot, making himself very troublesome. Of course we do not give each applicant a psychological examination. Perhaps in the years to come this will be done. Some of these cases, however, come to our attention and we eliminate them from our organization. It must not be understood, however, that we advocate eliminating the mental defective from our payroll. This would be far from the case. A man may be deficient mentally and still be a good workman. It is only when this deficiency is coupled with other weaknesses, either physical, moral, or otherwise, that a special hazard is created. A man so constructed is bound to be inefficient in any kind of position, no matter how simple it might be, unless special supervision is given him.

"In this connection we will cite three examples. First—Mr. X. Mr. X applied for a position in 1919 when he was 19 years of age. In brief, since 1919 he has been hired no less than ten times. On five ocasions he did not even start to work, and when he did start he worked only a very short period. He was of good appearance, neat, and from his conversation, in a hasty examination, one would easily conclude that he would develop into an average workman. We gave him a general intelligence examination. He tried hard but could answer only a half dozen questions. If we had used a psychological test on this man after he had failed the third time, we no doubt would never have bothered with him after that. It is also interesting to note that on two or three discharge slips he was termed intelligent by the foreman for whom he had worked.

"Second—Mr. Y. This man, about 40 years of age and of superb physique, showed a record of three years service with three transfers. Nothing appeared on his record which would indicate he was anything but a good workman. He was discharged May, 1925. He came to the Employment Office very indignant. He told us that the foreman had it in for him. He told of occasions when the foreman had stolen material from the factory and made other charges. His case was referred to the head of his division who called the foreman and others in for examination. While the case was being considered the Employment Office was asked to give him a mental test. His psychological examination indicated that he was feebleminded and was of such temperament that he was not only inefficient but bothersome as a workman. On going further into the history of the man it was found that due to the fact that he had a large family and was related to one of our old and respected employees he had never been discharged. He was tolerated against the better judgment of his foreman.

"Our psychological analysis correlated

closely with the finding of the department head. We found him of low mentality, low morals, subject to illusions, and of a type that might easily fall prey to serious infectious disease or serious accident.

"I had not thought of placing this case in this story but strangely enough as I sat writing this report, he came in the office and pleaded for a job. His right hand hung limp at his side. After some questioning I learned that he had got his hand so badly torn and burned while working in another plant of the community, that it was forever rendered useless. I have no doubt that had this man been retained by us we would have had to pay compensation for the loss of a hand, or perhaps something worse.

"Third—Mr. Z. This was a case where the position of sub-foreman was to be filled. Mr. Z. was recommended and to all outward appearance would fill the bill. The result of the Otis test we gave him was not very encouraging, but the recommendations were so decisive that we in the Employment Office did not have the courage to intervene. A year later he was returned to us with the statement, Not able to fill the bill.

"We plan shortly to use some tests for inspectors which we hope will be as successful as the tests we have already used in the fields mentioned above. We believe that as time goes on, we will accumulate material which will be of real value, and from which charts can be scientifically constructed showing in minute detail the successes and failures. Obviously there is very much to be learned by the average employment man who is unskilled in the use of psychological tests. A more rapid development will come when groups of employment men, after sufficient study and experiment, get together and pool their experiences and their results.

"A trained psychologist, reading this, would find it of little scientific value. Except in isolated cases this testing work has to be squeezed in whenever time permits and is at present more of a side issue in the routine of the Employment Office. As time demonstrates its value, no doubt more study and original experimental work will be done in this field by men actually engaged in placement work."

A. W. GROTEFEND,
*Assistant Personnel Director, The United States Aluminum Company, New Kensington, Penna.*

### FORTHCOMING MEETINGS

### *Annual Meeting of Personnel Research Federation*

### *Joint Conference with American Statistical Association*

Attention is called to changes in the arrangements for the annual meeting of the Personnel Research Federation announced in the July issue of this JOURNAL. Two business meetings will be held in the Federation's offices at 40 West Fortieth Street, New York, instead of at the Hotel Pennsylvania. They will be called at 10 a.m. on Friday, October 8th, 1926, and at the same hour on Saturday, October 9th.

At the first session the reports of officers will be heard, the research activities of member organizations presented and discussed, and questions regarding changes in the constitution pertaining to statement of functions and membership dues, will be considered. Election of the Administrative Board and officers, and presentation of the budget will take place at the Saturday session.

A program based on the general topic, "Increasing Labor Stability" has been planned for Friday afternoon and evening. The American Statistical Association will meet jointly with the Personnel Research Federation at these conferences, and matters of statistical procedure in personnel research will be particularly stressed. Both of these joint meetings are to be held at the Aldine Club, 200 Fifth Avenue, New York. The afternoon session will convene at 2:30; the evening session, at dinner, at 6:30. These meetings are open to all persons interested.

The program is in the hands of speakers actively conducting research or dealing

with statistical problems relating to labor stability. The papers at the afternoon session are: "Labor Turnover: How is its Significance Best Presented to Supervisors?", by Eugene J. Benge, Mitten Management, Inc.; "Company Records and Analysis of Causes of Exits," by Lloyd Miller, Metropolitan Life Insurance Company; and "Measuring Labor Stability," by Earl H. Loomis, Western Electric Company. At the evening session the program includes "Methods of Validating Employment Procedures," by Max Fred, Personnel Research Federation; and "The Value of Market Comparisons in Labor Turnover," by Anne Bezanson, Industrial Research Department, University of Pennsylvania. The following have been invited to discuss these papers: Sumner H. Slichter, Cornell University; Sam A. Lewisohn, Miami Copper Company; C. S. Yoakum, University of Michigan; Robert W. Burgess, Western Electric Company; Paul F. Brissenden, Columbia University; Shelby Harrison, Russell Sage Foundation; J. H. Morford, National Industrial Conference Board; Leo Wolman, National Bureau of Economic Research; David R. Craig, University of Pittsburgh; Florence DuBois, Metropolitan Life Insurance Company; Claude L. Peake, American Radiator Company; and Joseph H. Willits, University of Pennsylvania. Wesley C. Mitchell, of Columbia University, and Dean Wallace B. Donham, of the Harvard Graduate School of Business will preside at these sessions.

# New Type Examinations in the College of Physicians and Surgeons[1]

By Ben D. Wood, *Columbia College*

*This report on the evaluation of new type examinations is of interest to the medical college instructor and the educational research worker. For the one it presents a new educational tool; for the other a method for the construction and validation of such examinations. Tests in pharmacology and anatomy are discussed here. In the November issue Dr. Wood will continue his report and summarize his findings.*

### FOREWORD

ANYONE who follows the work of a class of students in medicine is surprised each year at the showing made by a considerable proportion of the group. The marks given their examination papers are often surprisingly high and quite as often surprisingly low. This leads the one who corrects the old fixed type of examination paper to wonder as to his ability as a critic or as to the dependability of the student or, perhaps, of the examination as a test of his mental equipment.

The idea that an examination in the Medical School could be prepared so as to give a more exact estimate of the student's ability was received by the members of the staff with enthusiasm and real hope, even if associated with some doubt. That such a plan would also decrease the labor connected with rating and grading such examinations brought even greater joy. Therefore, when Professor Wood discussed the project he had in mind it was taken up by several of the departments with enthusiasm. The following pages are excerpts from his reports to three of the departments.

We are trying to be conservative and reserve our final decision in the matter, but the results of this, his first study with us, make us at least optimistic for the future. We sincerely appreciate his efforts and trust that the studies may be continued.

William Darrach, M.D.,
*Dean.*

### I. PHARMACOLOGY

During the session 1924–1925, Dr. C. C. Lieb, Professor of Pharmacology in the College of Physicians and Surgeons, Columbia University, constructed (with some technical assistance from the writer) and tried out several examinations containing new type objective questions. Four monthly quizzes were about equally

[1] These studies were made possible by a grant from The Commonwealth Fund.

The writer owes special thanks to Drs. Cleveland, Lieb and Von Lockum for their generous coöperation; these studies could not have been made without their aid and advice.

divided as to time allowance between old type "essay" questions and new type objective questions; a fifty-minute new type test was given in April; and the final examination, of nearly four hour's length, was made up exclusively of objective questions. This final examination consisted of five parts, aggregating the formidable number of 794 items. In spite of the length and searching qualities of this examination, there were few complaints from the students; these complaints came almost entirely from students who were known to be at the lower end of the class. More than half of the students finished and handed in their papers before time was called, and the time was extended for the slower students by the proctors, so that it is practically certain that each student answered all the questions that he could have answered without time limits. Each form of the new type questions used in the quizzes is represented in the final examination; for illustrative purposes, therefore, it is necessary to reproduce here only a few questions from each of the five parts of the final examination.

COLLEGE OF PHYSICIANS AND SURGEONS
COLUMBIA UNIVERSITY

FINAL EXAMINATION IN PHARMACOLOGY,
JUNE 1, 1925

*Part I (54 items)*

Directions: Read each of the following paragraphs before attempting to make it intelligible. Then reread it and in each (....) choose the word or words capitalized which, in your judgment, most nearly expresses the truth and underline it or them. Example: Caesar invaded (Canada, Gaul, China, Britain).

1. The instillation of a few drops of a 2 per cent solution of cocaine hydrochloride into the conjunctival sac of the normal eye of the rabbit causes (Dilation, Contraction) of the pupil. The (Mydriatic, Myopic) effect is brought about by an action on the (Nerve Ends, Myoneural Junctions) of the (Parasympathetic, Sympathetic) division of the autonomic nervous system, which innervates the (Sphincter, Dilator) muscle of the iris.

*Part II (22 × 5 = 110 items)*

Directions: Tabulate the effects of the drugs heading the several columns on the state or condition of the *Functional Activity* of the structures, organs, tissues, etc. listed below. If effective therapeutic doses, administered in the ideal way, increase the *Functional Activity*, use "+"; if they decrease *Functional Activity* use "−"; if the drug has no action write "0": Complete column 1, as far as you can, before beginning column 2; then 2, then 3, etc.

| | EPINEPHRINE | PILOCARPINE | ATROPINE | NITRITES | STROPHANTHIN |
|---|---|---|---|---|---|
| 1. Splanchnic arteries | .... | .... | .... | .... | .... |
| 2. Splanchnic veins | .... | .... | .... | .... | .... |
| 3. Splanchnic capillaries | .... | .... | .... | .... | .... |

*Part III (100 × 5 = 500 items)*

Directions: In answering these questions assume, unless otherwise stated, that full therapeutic, but not toxic, doses are administered in an admittedly effective way to average adult patients who show neither increased nor decreased tolerance.

In Column 1 indicate by a "+" those drugs that in the presence of normal renal function have a diuretic action; by a "−" those that lead to a decreased tolerance.

In Column 2 indicate by a "+" all those drugs which are especially dangerous during pregnancy because of their possible harmful effects on mother or fetus; by a "0" those that have no such deleterious actions.

In Column 3 put a "+" opposite all those drugs that may be expected to slow

the heart of the average patient; a "–" opposite those that may be expected to accelerate it and a "0" opposite those having neither of these actions.

In Column 4 put a "+" opposite all those drugs which may be expected to dilate the bronchi and therefore be of value in the treatment of "spasmodic" asthma; a "–" after all those that are contraindicated in asthma because they contract the bronchi and a "0" after all those having no effect on the caliber of the bronchi.

In Column 5 put a "+" opposite all those drugs that have a corrosive, irritant or caustic action when applied to the skin or mucous membrane; a "–" after all those that have a demulcent or emollient action and a "0" after those having none of these actions.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. Acacia | | | | | |
| 2. Acetanilid | | | | | |
| 3. Acetic Acid | | | | | |

*Part IV (21 × 4 = 84 items)*

Directions: Compare the direct actions of Ether, Chloroform and Nitrous Oxide on the circulation during the stage of full surgical anesthesia. In answering the question, put in Column A "+" for stimulation, increase or improvement; "–" for depression or decrease, and "0" to indicate no action. If two or more drugs act on the same structure, function, etc., in the same direction (that is, if they depress it or if they stimulate it) indicate in Column B the relative intensity of their action by using 1, 2 and 3, 1 indicating the most intense action.

| | ETHER | | CHLORO-FORM | | NITROUS OXIDE | |
|---|---|---|---|---|---|---|
| | A | B | A | B | A | B |
| Sample answer: Muscle tonus | – | 2 | – | 1 | – | 3 |
| Heart: | | | | | | |
| Myocardium | | | | | | |
| Parasympathetic innervation | | | | | | |
| Sympathetic innervation | | | | | | |

*Part V (46 items)*

Directions: In each sentence select the correct alternative and put its number on the short line at the right.

1. A saturated aqueous solution of a volatile medicinal agent is called—1 a tincture, 2 an aromatic water, 3 a solution, 4 a liquor..... —
2. The official saturated aqueous solution of camphor is called—1 tincture of camphor, 2 spirit of camphor, 3 camphor water, 4 extract of camphor..... —
3. An aqueous solution of a non-volatile substance is called a—1 tincture, 2 liquor, 3 mixture, 4 spirit..... —

The score in each part was the number of correct responses. The average score of the 97 students constituting the class that took this examination was 465 with standard deviation 62.6. The scores gave a distribution which, in contrast with the distributions ordinarily afforded by old type examinations, is very similar to the normal curve of frequency. The scores ranged from 275 to 637.

### *Validity of new type final examination in pharmacology*

(Since we are here concerned with validity, and since the reliability of this examination will be made the subject of a special study in the near future, the reader may for present purposes make any reasonable assumption as to its reliability or accept the writer's estimate that it is not less than 0.95.)

The correlation between this final examination and the average of all quiz and class marks up to the final examination is 0.61. (N = 97 in all Pharmacology correlations.) Even considering the restricted range of

talent involved in the second year class of a medical college in which registration is strictly limited, this correlation coefficient of 0.61 is extremely unsatisfactory as a validity coefficient. It indicates that at least one of the two series of measures correlated is very imperfect.

In view of the very wide sampling of the materials of Pharmacology afforded by the 794 items of the final examination, it would seem reasonable, on *a priori* grounds, to infer that the cause of this low coefficient is the inadequacy not of the final examination, but of the criterion used, i.e., the average of all quiz and class marks up to the final examination. The correlation of the final with the average of the new type parts of the four quizzes is 0.58, while the correlation of the final with the average of the old type parts of the four quizzes is only 0.13. Thus it appears that, in so far as the criterion is concerned, most of the "validity" coefficient of of 0.61 is accounted for by the new type parts of the quizzes, and very little by the old type parts. Those who are unsympathetic to new type tests and who have the traditional faith in old type tests, would probably interpret these facts as follows: "The correlation of 0.58 indicates that the new type measures mere facts of knowledge very well, but the correlation of 0.13 shows that it measures nothing else, that it does not measure that quality of mind, reasoning ability, which is so essential in the medical profession, and which the old type essay examination displays so convincingly whenever it is present."

This quotation is, in fact, the explanation offered by one of the writer's colleagues. When asked for a concrete definition of "reasoning ability" this colleague defined it as the quality measured by old type tests, and declared the best available criterion of this quality to be the average of all marks attained in one or two years in the Medical College when the marks were based upon old type examinations.

In the College of Physicians and Surgeons, Pharmacology is a second year course, and we may therefore set up a criterion of "reasoning ability" which will fulfill the conditions imposed by those who are most suspicious of the merits of the new type question forms. This criterion is the average of the final marks received by these 97 men in all their Freshman medical courses, and in all their Sophomore medical courses except Pharmacology. If the new type tests correlate more highly with this criterion than the old type tests do, it would appear that the charge against the new type tests, that they measure only memoriter facts, is dissipated by the very trial relied upon by those making the charge. The following correlations between this criterion and indicated Pharmacology marks are almost conclusive.

Correlations of the average of all Freshman and Sophomore Medical School Grades (save Pharmacology) with:

1. Average mark on old type parts of 4 Pharmacology quizzes (aggregating at least 100 minutes of working time)..... 0.22
2. Average mark on new type parts of Pharmacology quiz-

| | |
|---|---|
| zes (aggregating not more than 80 minutes of working time) | 0.31 |
| 3. A 50-minute New Type Pharmacology test given in April 1925 | 0.36 |
| 4. The Final Pharmacology Examination, 794 objective questions | 0.54 |

This evidence shows beyond doubt, (1) that the new type not only measures breadth of information better than the old type and in less time, but (2) that the new type measures reasoning ability more fully and reliably than the old type does. It might be objected that these coefficients are all so low that they have little practical significance. In answer to this it can be definitely shown that these coefficients are brought to so low a tide by one, and only one, factor, namely, the incredibly low reliability of the old type examination marks, even when the marks of 15 to 30 hours of old type examinations are averaged.

*Intercorrelation of final grades in 12 medical courses*

Correlations between 12 pairs of the final course grades given during the 1923–24 and 1924–25 sessions range from 0.06 to 0.49, with average of 0.273. The six intercorrelations of the four sets of half-year average marks given in these two sessions range from 0.324 to 0.558, with average 0.446. The correlation between the Freshman and Sophomore year averages is only 0.495. All the marks involved in the foregoing correlations are based on old type essay examinations, since the Pharmacology grades were not used in any of them. It is difficult to conceive how any one could suppose that these old type examinations measure the same central factor "reasoning ability" and still afford intercorrelations so low as these. The *assumption* as to what they measure and the fact of their low intercorrelations are wholly incompatible. The case for the old type examinations as "convincing indicators" of "ability to reason with and apply knowledge to problematical situations" is made still more doubtful by the slowness with which the intercorrelations increase in magnitude as we increase the number of hours of old type examinations. If the claim that they measure the same quality, reasoning ability, is really true, then their intercorrelations may be treated as Reliability Coefficients, and the Spearman-Brown formula ought to apply. The fact of the business seems to be that the charge customarily made against new type tests, that they measure only "isolated and unrelated facts" should properly be made against the old type tests. The old type tests not only do not correlate with independent measures of known reliability and significance; they fail to correlate with each other!

Starting with $r_{11} = 0.273$, as the average intercorrelation of final course grades in the Freshman and Sophomore years in Medical College, the Spearman-Brown formula indicates that the correlation between first year and second year average marks would be about 0.65; actually it is only 0.495, —a difference of about 0.15. Starting with 0.495 the Spearman-Brown formula indicates, assuming the validity of the claim made by the protagonists of the old type examinations, that the reliability of our two year criter-

ion of medical college "reasoning ability" is about 0.67. Actually it is probably less than 0.57. Our four-hour new type test in Pharmacology gives a correlation with this criterion of 0.544, almost as great as its own liberally estimated reliability coefficient, and greater by a small margin than the correlation which the first year average gives with the second year average medical college grades!

### II. ANATOMY

In the Spring of 1925 Dr. Mather Cleveland, associate in the Department of Anatomy in the College of Physicians and surgeons, decided to try out a final examination made up exclusively of objective questions. Three quarterly examinations of the old type, each lasting one or two hours, had been given, and it was thought that the average of these would furnish a fairly reliable criterion of achievement in the anatomy course against which to measure the reliability and validity of the new type final examination. The new type final examination was made up of four types of questions, aggregating over 500 items in all. The scores attained by the 100 students constituting the freshman class ranged from 180 to 440, with average of 353 and standard deviation of 54.2. The first questions in each part are reproduced here for illustrative purposes:

#### *Part I. True-False*

Directions: Put a plus sign (+) on the dotted line at the left of each statement that is true and a zero (0) at the left of each that is false. Do not guess.

—1. The female mammary gland is situated in the deep fascia.

—2. The axillary vein lies lateral to the axillary artery.

—3. The rhomboid muscles are supplied by the posterior primary division of the fifth cervical nerve.

#### *Part II. Completion*

Directions: Complete the following statements in such a manner as to compose in your opinion a correct answer:

1. The vessels winding around the lateral margin of the pectoralis major muscle are.....
2. The structures penetrating the costo-coracoid membrane are.....
.....
3. The clavicle presents on its interior surface the following ridges or prominences.....

#### *Part III. Origin and insertion of muscles*

Indicate the origin by "O" and the insertion by "I" of the following muscles. One muscle is answered correctly to show the method.

| | SACRUM | COCCYX | OS COXAE | FEMUR | TIBIA | FIBULA | PATELLA | CALCIS | TALUS | NAVICULAR | CUBOID | CUNEIFORM | METATARSAL | PHALANGES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gluteus minimus | .. | .. | O | I | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Semimembranosus | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Adductor longus | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Astus lateralis | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |

#### *Part IV. Nerve-supply and action of muscles*

Directions: Give the nerve supply of each of the following muscles, and indicate the action or actions of each by number. The answer to the first is given as an illustration 1 Flexion; 2 Extension; 3 Medial Rotation; 4 Lateral Rotation; 5 Adduction; 6 Abduction; 7 Pronation; 8 Suppination.

| MUSCLES | NERVE SUPPLY | ACTION |
|---|---|---|
| Latissimus dorsi..... | Thoraco dorsal | 2-5-3 |
| Prenator teres..... | ..... | ..... |
| Biceps brachii..... | ..... | ..... |

*Reliability of new type final examination*

The reliability of Part I, consisting of 130 true-false statements is estimated by the Spearman-Brown formula to be 0.76, and of Part II, consisting of about 200 completion items, 0.89. It is planned to make an extended study of the reliability of this and other new type medical examinations in the near future; for present purposes the reader may accept the estimate of the writer that the reliability of the total examination, consisting of over 500 items, is not less than 0.95.

*Reliability of the old type criteria*

The intercorrelations of the three examinations of the old type give an average of 0.50. By using the Spearman-Brown formula we estimate that that the reliability of all three together is not above 0.71, and is almost certainly lower than 0.71, since we have evidence that the Spearman-Brown formula overestimates the growth of reliability in old type examinations. The average of these three one-hour examinations will be called the "anatomy criterion," and the average of the final course grades for all Freshman courses with the exception of Anatomy will be called the "college criterion." This "college criterion" is approximately the criterion of "ability in medicine" which the college uses as a basis for eliminating students at the end of the Freshman year, or passing them on into the Sophomore class. What is its reliability? The intercorrelations of the final grades in the four courses in question range from 0.44 to 0.56, with average of 0.52. From this coefficient of 0.52 the Spearman-Brown formula leads us to estimate the reliability of the grades of two of the courses to be about 0.67, and of all four courses together to be about 0.80. These figures are considerably higher than the corresponding figures secured in our study of the criteria used to test the validity of the Pharmacology new type examination. The explanation probably lies in the fact that substantial improvements were introduced into most of the examinations given in some of the courses taken by the Freshman class now in question. The effect of these improvements was in general an increase in the sampling of materials from the subject matters and an increase in the objectivity of the scoring.

Summarizing our estimates as to reliability we find that the new type test in Anatomy is much superior to either of the criteria against which which we may measure its validity:

| | |
|---|---|
| Reliability coefficient of n.t. final examination in Anatomy (500 + items) | 0.95 |
| Reliability coefficient of college criterion | 0.80 |
| Reliability coefficient of anatomy criterion | 0.71 |

*Validity of new type final examination*

The anatomy criterion and the new type final examination are two rival measures of the achievement of the class in the anatomy course. The correlation between these two measures is 0.731. Which is the more valid? *A priori* grounds alone would indicate that the new type final is by all odds the better of the two measures.

Its sampling of over 500 important facts of anatomy, its objectivity, its high reliability, as against the narrow sampling of the three old type, subjective examinations of low reliability, render any other conclusion almost impossible. The only objection that might be made is that it is a superior test of the "factual" aspect of the course of study, but not of the "reasoning ability" so important in medicine. This objection would be strongly supported if the correlation of the anatomy criterion with the college criterion were higher than that of the new type final with the college criterion, but these correlations are 0.684 and 0.81 respectively. To assert, in the face of these relationships, that the anatomy criterion is a better measure of "reasoning ability" than the new type final, is to assert that the anatomy criterion, made up of more than three hours of old type examinations, is a better measure of reasoning ability than the college criterion made up of approximately 12 hours of old type examinations.

*Validity of each part of new type final examination*

The correlations of each part with the anatomy criterion and with the college criterion were calculated with the following results:

| | ANATOMY CRITERION | COLLEGE CRITERION |
|---|---|---|
| Total n.t. final | 0.731 | 0.810 |
| True-false | 0.688 | 0.667 |
| Completion | 0.722 | 0.765 |
| O-I | 0.540 | 0.723 |
| Nerve supply | 0.256 | 0.451 |

The order of excellence would thus seem to be, from best to poorest, Completion, True-False, 0-I and N.S.-muscle action. When the time element is considered, however, the two best would exchange positions; and much of the apparent inferiority of the 0-I and N.S. tests might disappear: it must be remembered that these two tests occupied much less time than the true-false and completion tests. The completion part undoubtedly took three times as long to answer as the true-false part; so that in the time allowed to the completion part the students could have taken three times as many true-false questions as were given in this examination. The validity of 390 true-false questions would undoubtedly be greater than 0.765.

(*Manuscript received June 20, 1926*)

# Interest Analysis of Personnel Managers

By Edward K. Strong, Jr., *Stanford University*

*In the September issue of the* Journal of Personnel Research *Dr. Strong demonstrated how the interest analysis could be scored to differentiate between personnel managers and a group of others in a wide variety of occupations. Here Dr. Strong shows the relative standing of personnel managers in the interest analysis when they are scored for interest in each of thirteen different occupations.*

IN THE September issue of this Journal thirteen occupational groups were compared as to their personnel interest on the Vocational Interest Blank. There it was shown that only 3.5 per cent of non-personnel managers rated A, i.e., as high as the 75 per cent of personnel managers who scored highest on the interest test; and that 24.8 per cent of non-personnel managers scored B, i.e., as high as the 25 per cent of personnel managers who scored lowest on the test. There was in all, then, an overlapping of 28.3 per cent, or a separation of 71.7 per cent.

A report is here made of the results obtained when the personnel group is tested for their interest in thirteen other occupations.

The data are presented in figure 1. The first distribution at the top of the figure gives the distribution of the personnel managers when scored for personnel interest. The 48 men are identified by numbers from 1 to 48 in order of their ranking on this scale. The first twelve constitute the first quarter; the second twelve, the second quarter; etc. Following the scheme of rating described last month, the personnel men numbered 1 to 36 inclusive are rated A for personnel interest, the remainder (37 to 48) are rated B. In the case of this particular occupational group there is no distinction between those rated A and those rated B as far as achievement in personnel work is concerned—at least the writer can see no distinction.[1]

The scale used in the preceding article was in terms of raw scores. In order to make comparisons easier the scores are given here in terms of the probable error of the distribution.[2]

The second distribution in figure 1

[1] As all the data have been obtained on the understanding that they are confidential the writer is unable to present proof of a number of statements in this report nor can he give a number of interesting confirmations of the value of this test from the life histories of these men.

[2] For example, the median of the raw scores using the personnel scale is 180 and the P.E. is 40. Consequently 180 has been subtracted from the score of each individual and the differences divided by 40. The same procedure has been used in the case of the thirteen other scales, although of course the numerical equivalent for median and P.E. have been different in each case.

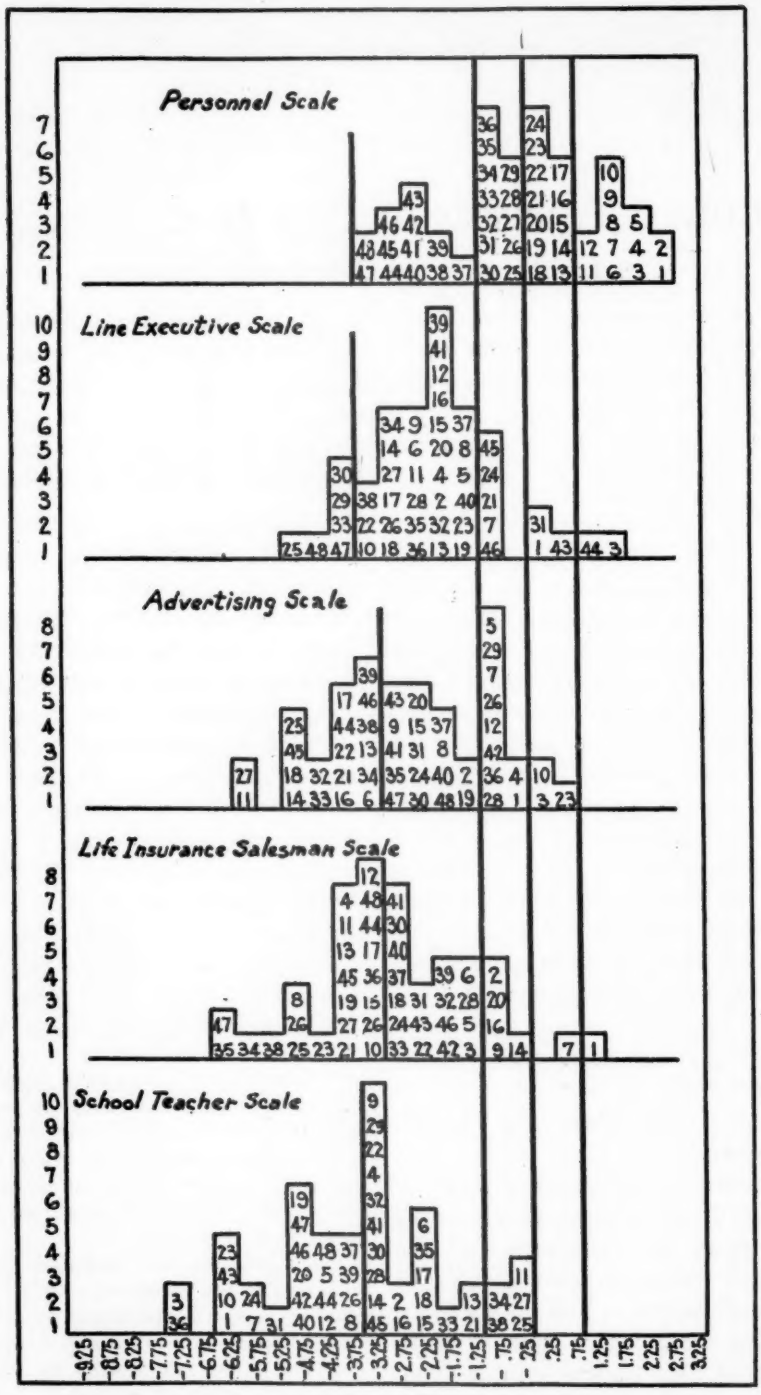



FIG. 1. (PART 1.) INTEREST ANALYSES OF 48 PERSONNEL MANAGERS SCORED FOR 14 DIFFERENT OCCUPATIONS

**The figures 1 to 48 represent the ranks of the personnel managers in the scale for personnel interests. The three vertical lines divide each curve into quarters based on the scores of the men in that occupation. The vertical line to the left represents the lowest score made by a man in that occupation.**

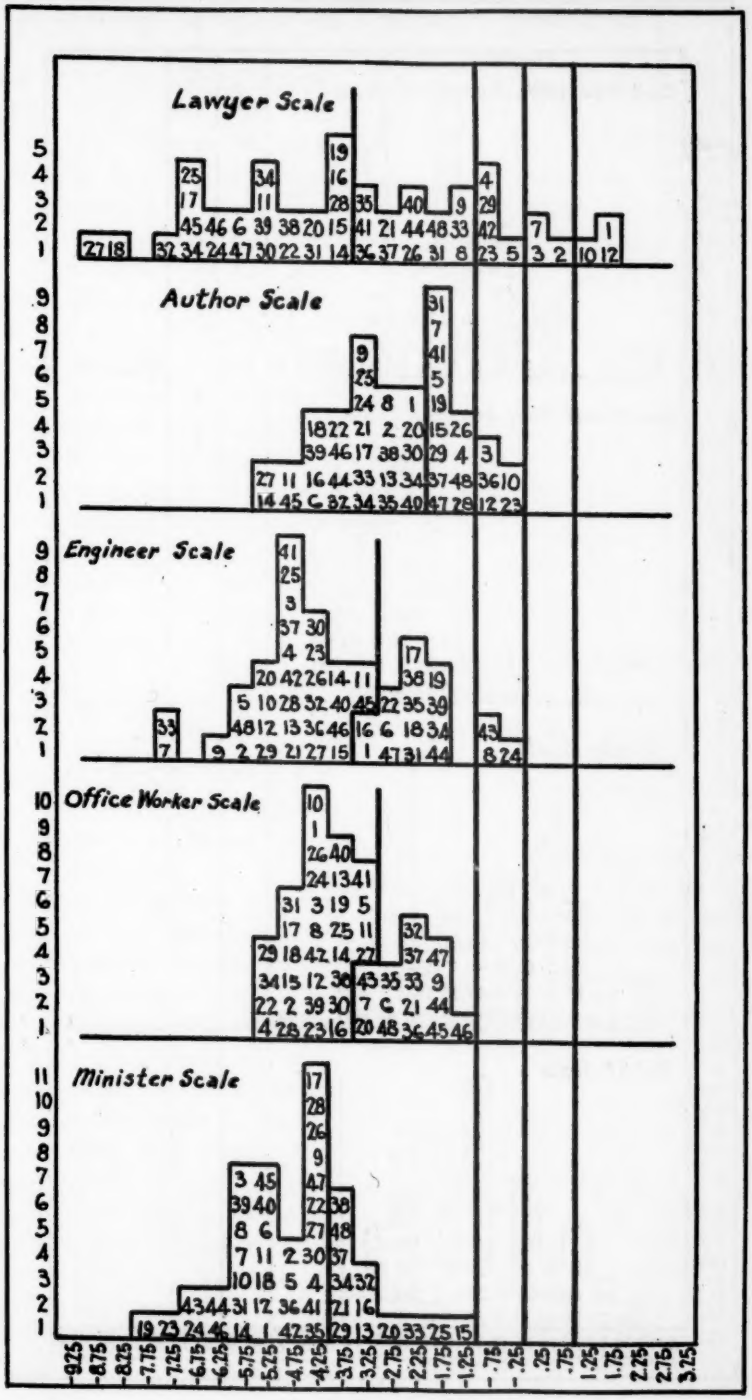

Lawyer Scale
Author Scale
Engineer Scale
Office Worker Scale
Minister Scale
-9.25
-8.75
-8.25
-7.75
-7.25
-6.75
-6.25
-5.75
-5.25
-4.75
-4.25
-3.75
-3.25
-2.75
-2.25
-1.75
-1.25
-.75
-.25
.25
.75
1.25
1.75
2.75
2.75
3.25

FIG. 1. (PART 2)

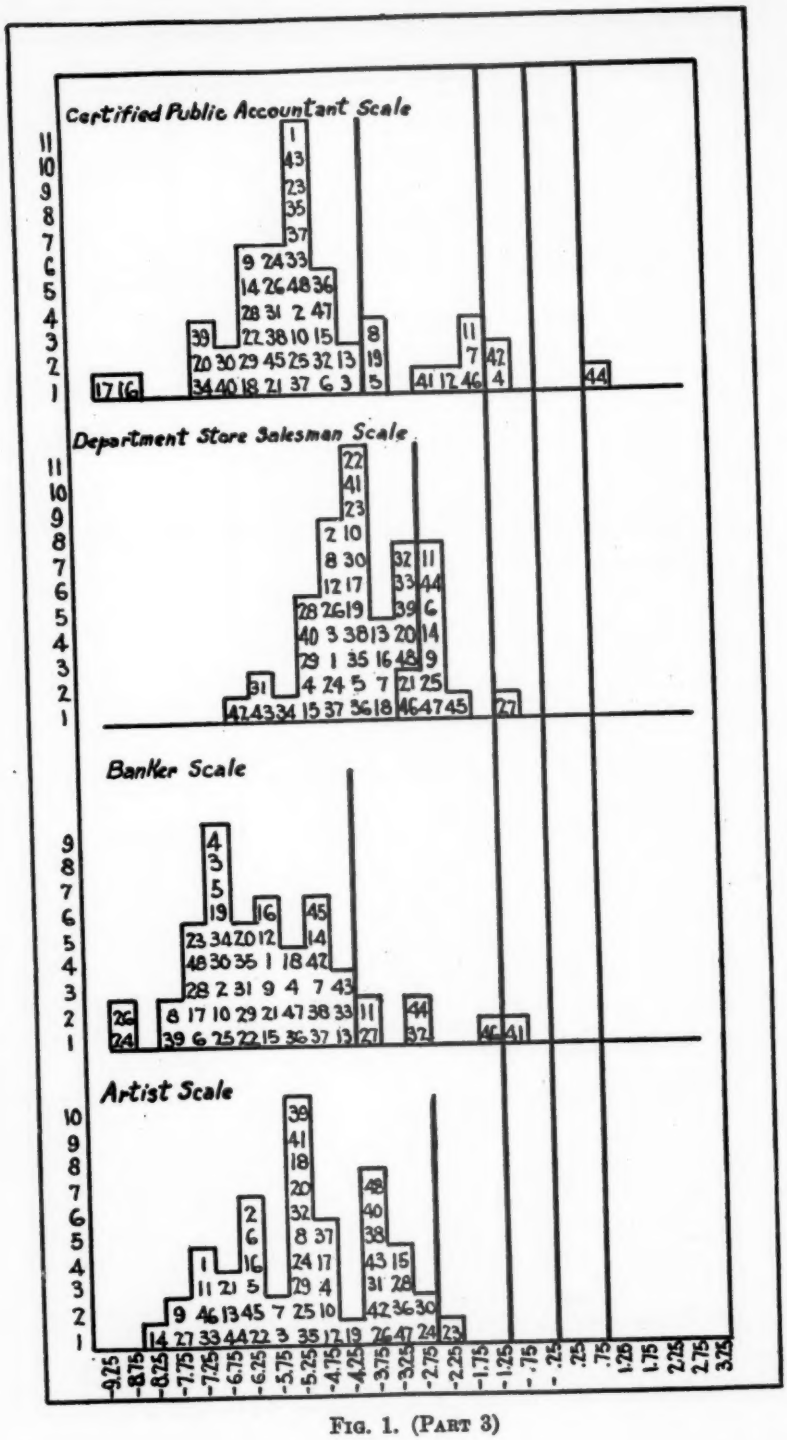

Certified Public Accountant Scale
Department Store Salesman Scale
Banker Scale
Artist Scale
-9.25
-8.75
-8.25
-7.75
-7.25
-6.75
-6.25
-5.75
-5.25
-4.75
-4.25
-3.75
-3.25
-2.75
-2.25
-1.75
-1.25
-.75
-.25
.25
.75
1.25
1.75
2.25
2.75
3.25

FIG. 1. (PART 3)

presents the distribution of the personnel managers when scored for line executive interest. The overlapping in this case is great,—21 per cent of personnel managers rate A in line executive interest; 67 per cent, B; and only 12 per cent, C. The four vertical lines drawn through these distribution charts divide the distribution into quarters on the basis of the distribution of the men who belong to the given occupation. By definition the three lines to the right must come at +1.0, 0 and −1.0 on the scale. But the fourth line is drawn just below that score obtained by the man in each occupational group who scores lowest in his group. Because of this fact the fourth line appears at different points with the various occupational distributions. In each case, then, the personnel managers who appear to the left of the fourth vertical line rate C, i.e., they score lower than any man who is known to belong to the occupation in question.

The third part of figure 1 presents the distribution of the personnel managers when scored for interest in advertising. The control advertising group are composed of 49 account executives from a number of advertising agencies. Here the overlapping is still large, i.e., 60 per cent.

In tabular form the overlappings are as shown at top of next column.

If these figures are representative of the true situation it means that the typical personnel manager has interests that fit into those of men in one or more other occupations, particularly those of line executives, advertising men, life insurance salesmen, school teachers and lawyers. The personnel manager is not so apt, however, to have the interests of engineers, office workers, ministers, certified public accountants or salesmen in a department store, and is not at all likely to have the interests of a banker or artist.

| | RATING OF PERSONNEL MANAGERS | | |
|---|---|---|---|
| | A | B | C |
| | per cent | per cent | per cent |
| Personnel men | 75 | 25 | 0 |
| Line executives | 21 | 67 | 12 |
| Advertising men | 27 | 33 | 40 |
| Life insurance salesmen | 14 | 38 | 48 |
| School teachers | 10 | 42 | 48 |
| Lawyers | 23 | 27 | 50 |
| Authors | 11 | 28 | 61 |
| Engineers | 6 | 29 | 65 |
| Office workers | 0 | 33 | 67 |
| Ministers | 0 | 27 | 73 |
| C. P. A's | 6 | 17 | 77 |
| Department store salesmen | 2 | 21 | 77 |
| Bankers | 2 | 10 | 88 |
| Artists | 0 | 2 | 98 |

It is very significant that men in these twelve occupations are apt to have the interests of a personnel manager in just about the ratio that personnel managers have interest in their occupation. The total overlapping in these two cases follows:

| | per cent | per cent |
|---|---|---|
| Line executives | 88 | 39 |
| Advertising men | 60 | 44 |
| Life insurance salesmen | 52 | 35 |
| School teachers | 52 | 35 |
| Lawyers | 50 | 47 |
| Engineers | 35 | 34 |
| Office employees | 33 | 26 |
| Ministers | 27 | 36 |
| Certified public accountants | 23 | 34 |
| Department store salesmen | 23 | 14 |
| Bankers | 12 | 12 |
| Artists | 2 | 0 |
| Average | 38 | 28 |

The first column of figures gives the percentage of personnel men who score like the occupation named, the second column gives the percentage of men in the occupation who score like personnel managers.

The chief exceptions to be noted to the paragraph above are that personnel managers have interests more in common with these occupations than do men in these occupations with personnel men; and that this is strikingly true in the case of line executives. Nearly all personnel managers have interests in common with line executives but the majority of line executives do not have interests in common with personnel managers. (The coefficient of correlation based on the rank order of these two columns is 0.82.)

Does a personnel manager who scores high in personnel interest tend to score high in other occupational interests or is the reverse the case? The coefficients of correlation based on rank order are as follows:[3]

| | |
|---|---|
| Law and personnel | +0.47 |
| Life insurance and personnel | +0.31 |
| Advertising and personnel | +0.30 |
| Line executive and personnel | +0.15 |
| Author and personnel | +0.14 |
| C. P. A. and personnel | +0.10 |
| Teacher and personnel | 0 |
| Department store selling and personnel | −0.04 |
| Minister and personnel | −0.10 |
| Artist and personnel | −0.23 |
| Office employee and personnel | −0.26 |
| Engineer and personnel | −0.36 |
| Banker and personnel | −0.39 |

The coefficient of correlation between this order of merit and that in the first column just above is +0.67 and that in the second column is +0.78. The second coefficient naturally should be high, as it is based on the same data, but in the first case it is surprising as the two sets of data are obtained from thirteen occupational groups scored for personnel interest in the first case and from personnel men scored thirteen ways in the second case. It would seem that we have here a measure of the commonness of interests between personnel men and men in these thirteen occupations. When more is known about such relationships it will undoubtedly be possible to deduce some of the common elements but it is futile to do so at the present time.

[3] By oversight No. 48 was omitted from the calculations.

### EVIDENCE THAT THE RATINGS ARE CORRECT

Is there any evidence that these ratings are correct—that personnel manager No. 1, for example, who is rated very high in personnel, life insurance and law and very low in school teaching has really the interests corresponding to these ratings?

To obtain some data on this point the writer mailed to the forty-eight personnel managers a statement of their ratings and requested that they indicate their interest in the thirteen occupations by checking one of the following statements:

Never considered this profession.
Have at times day-dreamed of this profession.
Have seriously considered this profession.
Really believe I am fitted temperamentally for this profession.

Replies have been received from thirty-two men. The first item is scored zero; the second, one; the third, two; and the fourth, three.

The totals are given in the first column below. To contrast with these figures there are the totals obtained from scoring a rating of C in the interest test, one; a rating of B, two; and a rating of A, three. These totals appear in the third column below.

| | TOTAL OF SCORES REGISTERED BY PERSONNEL MANAGERS | RANK ORDER | TOTAL OF RATINGS BY INTEREST TEST | RANK ORDER |
|---|---|---|---|---|
| Personnel | 86 | 1 | 88 | 1 |
| Line executive | 72.5 | 2 | 60 | 2 |
| School teacher | 58 | 3 | 38 | 4 |
| Engineer | 47.5 | 4 | 26 | 7 |
| Lawyer | 39.5 | 5 | 37 | 5 |
| Advertising | 24.5 | 6 | 45 | 3 |
| Life insurance | 18.5 | 7 | 33 | 6 |
| Banking | 17.5 | 8 | 9 | 12 |
| Office work | 17.0 | 9 | 16 | 9.5 |
| Minister | 11.5 | 10.5 | 16 | 9.5 |
| Artist | 11.5 | 10.5 | 2 | 13 |
| C. P. A. | 7 | 12 | 18 | 8 |
| Department store salesman | 6 | 13 | 11 | 11 |

The correlation between columns two and four is 0.83. If the first two occupations, personnel and line executive, were excluded on the ground that these personnel men naturally would rate themselves high in these two occupations the correlation is lowered to 0.73. School teaching and egnineering are rated proportionately higher by the personnel managers, and advertising and life insurance proportionately lower, than by the interest test. Many of these personnel managers are engaged in educational work and probably scored teaching high for this reason. Also a number have taught for some time. But in most of these cases comments were made to the effect that they disliked school teaching. The writer is convinced that if a scale were developed for educational directors, as such, it would be shown that such a scale would not correspond very closely to the present one of school teacher. In the case of engineering the footnotes on the questionnaires indicated that a considerable number of the group have at one time prepared themselves for this profession. But all these men have abandoned it. Only one wishes he could be an engineer today and he rates A in the test. A number of his past achievements suggest this aspiration is based on genuine interest.

If the lower critical score for interest in the work of an artist were lowered 30 points, four personnel managers would be rated B as artists in addition to No. 23 who is so rated already. Of the five, two have never considered the work of an artist: one states he "can sketch;" another, that he has "considerable artistic ability;" and a fifth that he has "made a comfortable living as an artist." Twenty-six of the remaining twenty-seven stated they have never considered this profession; the twenty-seventh stated he had seriously considered it. In other words, using a lowered critical score, three of the five personnel men rating B on the artist scale have some artistic ability, and only one of the twenty-seven rating C suggests that he has. It seems truly uncanny that a test of this sort will pick out artists with such a degree of accuracy.

None of these personnel managers indicated in the questionnaire blank sent with his record that the ratings on him seemed generally incorrect. One stated the rating of C in teaching was wrong. He has to his credit some very good training work in industry. But the writer, as stated above, does not believe that interest in teaching men in industry is identical with that

in teaching children in school. In a number of cases the checks on the questionnaire do not agree with the interest test rating. For example, one man, rating C in law, reported that he had seriously considered law. On the other hand, several stated the test had sized them up remarkably well. For example: "In my case the results quite hit the mark, I believe; I think you have something quite worth while." "Your ratings have come pretty close to my interests as I have reviewed them over the past thirty years." "Am intrigued by your test. It looks pretty good to me, particularly for vocational guidance and in selection of young men. As to my own personal ratings—am interested and think it hits fairly close. Certainly the two classifications in which I rate A are the ones I would choose were conditions such that I were a free agent." "My interests regarding occupations have shifted fundamentally twice: first soon after graduating from college and then again during the war. The above analysis is based on my post-war interests. I feel that your report hits very close to my actual inclinations."

### DATA FROM ADDITONAL PERSONNEL MEN

The ratings of three additional personnel managers, whose papers were mislaid until after the above tabulations were completed, are:

| NUMBER | PERSONNEL | EXECUTIVE | LAWYER | LIFE INSURANCE SALESMAN | C. P. A. |
|---|---|---|---|---|---|
| 66 | −3.2 B | −3.1 B | −2.9 B | −3.4 C | −1.2 B |
| 69 | −3.6 C | −1.1 B | −3.1 B | −3.4 C | −4.6 C |
| 70 | −1.3 B | −1.3 B | −6.0 C | −1.2 B | −6.2 C |

If the record of No. 69 had been included in the personnel group it would have been necessary to reduce the lower critical score from −3.2 to −3.6.

One personnel manager was excluded because he has only recently been appointed to this type of work. His ratings are

| NUMBER | PERSONNEL | EXECUTIVE | LAWYER | LIFE INSURANCE SALESMAN | C. P. A. |
|---|---|---|---|---|---|
| 62 | −3.5 C | −2.3 B | −4.0 C | −3.0 B | −2.1 B |

If No. 69 had been included in the personnel group then No. 62 would be rated B not C.

Several assistants to personnel managers were excluded from the criterion group because they had not served five years or because their work had been restricted to one specific phase of personnel work. Their ratings are:

| NUMBER | PERSONNEL | EXECUTIVE | LAWYER | LIFE INSURANCE SALESMAN | C. P. A. |
|---|---|---|---|---|---|
| 60* | +0.2 A | +0.3 A | −1.2 B | −0.4 A | −3.4 B |
| 61 | −4.4 C | −4.0 C | −6.4 C | −4.7 C | −3.5 C |
| 63 | −1.9 B | −0.6 A | −2.9 B | −2.7 B | −0.4 A |
| 64* | −3.1 B | −1.6 B | −6.7 C | −1.0 B | −3.6 C |
| 65 | −2.1 B | −0.8 A | −6.2 C | −2.1 B | −3.0 B |
| 67 | −3.8 C | −1.9 B | −5.1 C | −1.2 B | −0.9 A |
| 68 | −1.3 B | −2.1 B | −0.7 A | −2.2 B | −4.7 C |
| 71 | −1.2 B | −2.0 B | −7.2 C | −2.3 B | −3.9 C |

* Has since resigned.

The one conclusion that can be drawn from these additional data is that the lower critical score for personnel interest should be lowered to −3.6 P.E. This will increase the overlapping between personnel and other occupational groups. The four men now ranking as personnel managers (Nos. 62, 66, 69, and 70) would all then be rated B.

(*Manuscript received June 9, 1926.*)

# Vocational Training for Subnormal Girls

## An Experiment in the Garment Machine Operating Trade[1]

By Edna W. Unger, *Vocational Adjustment Bureau, New York City*

*It is a well-recognized fact that subnormal girls in industry are usually found in unskilled occupations. To determine whether or not they can be trained for a semi-skilled or skilled occupation is the purpose of this study. The results show that a certain proportion can be trained, and that this proportion can be chosen in advance by the use of various selective devices here described.*

THE Vocational Adjustment Bureau, 336 East 19th Street, New York City, is a non-commercial, non-sectarian placement bureau for the maladjusted girl. This group includes the subnormal, delinquents, and potential delinquents, neurotics, and those with psychopathic tendencies. The Bureau aims to fit the girl into the job which best suits her needs through a careful analysis of her history, capacities, aptitudes, tendencies, and desires, a careful analysis of the job requirements, and an investigation of each firm.

### THE EXPERIMENT

Most of the subnormal girls placed by the Bureau are given unskilled jobs bringing relatively low wages and much shifting from job to job. Need was felt for determining experimentally whether or not these girls could be trained in semi-skilled or skilled operations of a trade. The garment machine operating trade was chosen for the experiment because of the opportunities and because machine work makes no great intelligence demands.

Work was begun during the sum-

[1] This experiment would have been impossible had it not been for the untiring efforts of Miss Mary McCristall, the teacher of the class; the generosity of the Emanuel Sisterhood of Personal Service; and the sympathy and coöperation of Mrs. Celia Strakosch and the members of her staff and of Miss Katherine Treat and the other members of the Staff of the Vocational Adjustment Bureau. To Dr. Arthur F. Payne of Teachers College, who made invaluable suggestions and helped with the organization of material, the utmost gratitude is due.

Because of lack of space, it has been necessary to condense greatly the report of this experiment. Many data were gathered and many analyses made which are not mentioned here. Those interested in greater details may see the complete study by applying to the writer at the Vocational Adjustment Bureau, 336 East 19th Street, New York City.

mer of 1923 in an exceptionally favorable workroom equipped with thirteen single needle machines at the Emanuel Sisterhood of Personal Service, 318 East 82 Street, New York. The experiment was continued until March, 1925. Through an arrangement with the Board of Education, girls from the Ungraded Classes of the public schools were permitted to attend this experimental workroom for a half day, each day, for a period of six weeks. Thus each girl attended approximately ninety hours.

The class was designed purely for experimental purposes with no view to training the girls for the trade. Its purpose was to find out by actual trial on the machine whether girls of subnormal mentality are capable of learning to run an electric sewing machine sufficiently well to meet the demands of the operating industries, and if so, what factors contribute to their success.

The machine work was in charge of a highly trained and experienced trade teacher and was directed by the writer. As far as possible the atmosphere of the shop rather than of the classroom was maintained and trade standards were adhered to as nearly as possible in every phase of the work.

Each girl was given the Terman Revision of the Binet-Simon Scale and certain motor tests with a view to finding out if a short team of tests might predict success as well as an actual trial on the machine. Careful personal records of each individual which were considered essential to an understanding of the total situation were made.

## DESCRIPTION OF GIRLS IN EXPERIMENTAL CLASS

During the period from July, 1923, to March, 1925, 170 girls were tried out at the machines. Of this number, 148 were sent by the public schools, and 22 by the Vocational Adjustment Bureau. Of the entire number, only 118 cases were considered in the final study. Of this number, 112 came from 13 public elementary schools, and 6 from the Bureau. Of the 52 not included, 16 were omitted because the I.Q. was above 70, which was taken as the upper limit for admission to the experimental class. The rest were omitted because of incomplete ratings.

*Chronological age.* The girls ranged in chronological age from 12 years 4 months to 19 years. Eighty per cent were between the ages of 14 and 16 years. The average age was 14 years 8 months.

*Mental age.* The girls ranged in mental age from 5 years 10 months to 11 years 2 months (the mental age of an individual 16 years of age whose I.Q. is 70). The average mental age was 8.9 years.

*Intelligence quotients.* The I.Q.'s, figured with 16 years chronological age as the adult level, ranged from 40 to 70. The average I.Q. was 58.

*Delinquency.* Two of the girls referred by the Bureau were on parole from correctional institutions. It was felt that practice in a trade would help establish these girls industrially. (One of them has subsequently married.) One girl during the test period was found guilty of petty thievery. One girl was responsible for

smutty drawings on the walls of the lavatory. Two were reported by the public schools as truant cases and three others remained away occasionally without legitimate excuse.

*Psychopathic trends.* Two girls were suffering from inferiority complexes; one girl used boasting as a compensation mechanism; one girl was suffering from delusions of persecution. Six girls showed slight signs of emotional instability as evidenced by marked tendency to quarrel, involuntary outbursts of laughter, etc. One girl deliberately slashed everything with her scissors. Three girls showed marked signs of depression.

It was felt that 39 cases might benefit by a neurological examination, but it was not possible to provide this except for a very few. In these cases the examination was superficial and the results negative.

One or more of such general tendencies as loquaciousness, nervousness, sluggishness, sophistication, hypersensitivity, moodiness, and the like were noted in 79 cases.

Fourteen cases presented personality traits that were likely to cause future difficulty in adjustment.

The group, however, was fairly stable.

*Physical condition of the group.* Unfortunately there was no provision for a physical examination of these girls. All of the defects noted were externally visible. Two had hemiplegias; one had a facial paralysis; one had a slight deformity; four had skin diseases; fourteen suffered from obesity; two had defective teeth; thirteen had speech defects; eleven lisped; two stuttered; one had a scarred lip; one was left-handed; one had chorea; one had a misshapen finger; six had eye defects (one had a filmy eye, three were cross-eyed, one had one eye smaller, and one had a twitching eye).

*School education.* The girls tested had different amounts of school education. Every girl with the exception of the one who attended a parochial school, had attended a public elementary school of New York City.

The six girls referred by the Vocational Adjustment Bureau were no longer in attendance at any school at the time of this experiment. Of these six, one was an elementary school graduate who had attended the dressmaking course at the Manhattan Trade School for six months but was a complete failure, one left in 4A, one left in 7A, two left in 7B, one was indefinite. Thus 5 per cent of the total group was out of school.

Of the 112 girls still in school, 64, or 54 per cent of the total, were in the ungraded classes (those classes in the New York City public schools for children of less than average intelligence). Forty-eight girls, or 41 per cent of the entire group, were distributed in grades 4B to 7B (one girl was in a foreign class). The average grade for these 48 cases was 6A.

The 64 girls in the ungraded classes at the time of this experiment had reached different academic grades before being transferred to these special classes. The range of grades reached was from 1A through 6B. The average grade reached was 3B. It cannot, however, be deduced from

this that some of the girls did not give early evidence of mental retardation, since many times recognized cases of subnormal intelligence are not transferred to the ungraded classes because of lack of room.

*Occupations of parents.* The occupations of the fathers and mothers are treated separately as being of different significance. In the case of the mothers, the fact that they are wage-earners is the significant factor, whereas in the case of the fathers, the type of work engaged in is of importance. Thirty-five per cent of the mothers were engaged in gainful occupations; 65 per cent were at home. There were four janitresses, two midwives, sixteen factory workers, three dressmakers, three saleswomen, one storekeeper, eight day workers, and three factory homeworkers.

Of the fathers, 20 per cent were store proprietors, 27 per cent skilled laborers, 30 per cent unskilled laborers 21 per cent incapacitated, out of work, or not known.

The rent paid by only 59 families is known. The range was from $10 to $47 a month. Approximately 50 per cent paid between $18 and $25. So far as is known only 5 of the 118 families were receiving help from any charitable organization.

### ENTRANCE TESTS

To the knowledge of the writer no satisfactory tests have been devised for the selection of garment machine operators although a few firms have satisfactory tests for certain specific operations.

Since the purpose of this test course was to do away with the conjectures on which the placement of subnormal girls in the machine operating trades has been based, no entrance examination was given. The group was unselected except as to intelligence. Had any sort of preliminary elimination been carried out, it would have meant that once again ability as a machine operator was being roughly gaged on the basis of a judgment whose correlation with actual ability had not been proved.

In view of the fact that no tests were available for estimating ability to run an electric sewing machine and because it was desired to determine as scientifically as possible what are the factors, if any, that make a subnormal girl a successful machine operator, all of the girls in this class were put through the same experimental tests. The experiment has resulted in the discovery of a team of tests for eliminating probable failures as machine operators. Should anything subsequently be done in the matter of training subnormal girls for this trade, these tests and other elimination methods devised as a result of this experiment should be applied at the outset.

### COURSES GIVEN IN EXPERIMENTAL WORKROOM

The course in the experimental class was planned to cover a period of six weeks, three hours a day, five days a week. Thus complete attendance at the class covered a period of ninety hours.

This was considered a reasonable time in which mentally retarded girls might become sufficiently adjusted to a new situation to show signs

of ability. Moreover, this period roughly approximates the maximum learning period allowed a beginner by a factory manager in industry (from one to two weeks). Any difference in learning period allowed in the factory and in the testing class makes allowance for the absence of the incentive of monetary remuneration, and also the pressure of the factory which, in spite of every effort is very difficult to approximate in a class.

The work of the course was divided into a certain number of projects. Each project involved a certain number of processes or operations. The processes were derived from analyses of the garment machine trades where lockstitch or single needle machines are used. Similar processes from various jobs were then grouped and arranged in order of difficulty. With these graded processes in mind, these course projects were then planned, each new project to involve some or all of the processes in the preceding project, plus at least one new process.

The first five weeks of the course were planned to cover the fundamentals of garment machine operating, involving those operations that a beginner in the industry might be given to do. This part of the test was intended as the basis for the measurement of the ability to acquire skill in the operation of an electric sewing machine.

Each girl was permitted to proceed at her own rate of speed. Errors were corrected to the limit of improvement. Not every girl tried every step in the course. Many had reached their maximum capacity well before the end.

The following list gives the various operations included in the projects of the course, arranged in order of approximate difficulty.

1. Control of power
2. Straight stitching
3. Turning corners
4. Turning curves
5. Plain seams
6. French seams
7. Bag seams
8. Flat fell seams
9. Hems
10. Hemmed corners
11. Bias stitching
12. Gathering
13. Placing band
14. Tucks
15. Receiver tuck
16. Placket

The sixth week of the course was used for concentrated work for each individual operation. Those girls were excluded from this part of the course who had shown themselves incapable of the simplest operations. Thus, after a general working knowledge of the fundamental operations in the trade was obtained, each girl was given an opportunity to do the probable equivalent of what would be required of her in industry. She was allowed to try section work. Dozens of similar garments (small boys' blouses) were cut. The completion of this garment involved thirteen different operations so that each individual in a group would be responsible for the completion of a single operation. The operations involved were graded according to difficulty. The ability of the individuals within a group was also roughly graded, and the steps assigned accordingly. The work as completed passed from one individual to another.

The sixth week of the course called out persistence in working on a single operation under some pressure.

### STANDARDS AND MEASURES OF ACCOMPLISHMENT

As nearly as possible, the same standard was applied to this group as is applied to beginners in the trade. Is the work up to trade standard? Can it be used in saleable articles? Since no objective scales or stencils have been devised for this trade and since the work involved the simplest processes in machine operating derived from all the sewing machine trades (using lockstitch machines), no purely objective measure could be used. The following five-point rating scale was used in grading work by the trade teacher:

| RATING SCALE | NUMERICAL EQUIVALENT | TRADE EQUIVALENT | EXPLANATION |
|---|---|---|---|
| Good | 5 | Above average | Acceptable according to trade standards |
| Fair plus | 4 | Slightly above average | |
| Fair | 3 | Average | |
| Poor plus | 2 | Slightly below average | Not acceptable according to trade standards |
| Poor | 1 | Below average | |

As soon as completed, each step of the work of each girl was rated on the above scale. Each rating represented a measure of accomplishment for the process involved.

At the end of each day, each girl was given a set of summary ratings based on the accomplishment ratings for all the operations attempted that day. The daily summary ratings consisted of ratings on the items tabulated on page 249, using the same rating scale for each.

For a thirty-day test, then, an individual received thirty ratings on the five-point scale in each of the six items listed above.

A final average rating in each of these items, accuracy, speed, neatness, handling, grasp of directions, and attitude, was obtained for the complete test.

Since accuracy and speed are of greater importance in industry, than neatness, handling of material, ability to grasp directions, or even attitude toward work, these items were weighted in obtaining the final rating for the measure of accomplishment. The final ratings in accuracy and speed were each given twice the value of the other items. The final rating was obtained by adding the weighted scores and dividing by eight. This measure of accomplishment is a strict numerical weighted score obtained as objectively as possible.

Since the purpose of this experiment was not only to measure the trainability of the subnormal girl as a power machine operator but also to gage her probable success as an operator in industry, another rating was added to this weighted score. Taking into consideration the absence of the incentive of remuneration, competition, pressure, strain, etc., the chance of success of each individual as an operator was judged by the trade teacher. Some who rated well in actual accomplishment had to be rated subjectively as possible failures in industry for various reasons, such as nervousness, inability to concentrate, quarrelsomeness, need

of constant prodding, etc., while others who rated slightly below average on the basis of actual accomplishment, were considered possible successes for such reasons as personality, failure to put forth full effort because of lack of compensation, etc.

*Daily summary ratings for each individual for her own amount of work included six ratings for the following items*

| ITEM | INTERPRETATION | STANDARD |
|---|---|---|
| 1. Accuracy..... | Involves quality of work; correctness, precision, exactness | A rating of "fair" in accuracy indicates quality of work up to minimum standard demanded in trade. Above or below average rated as explained |
| 2. Speed..... | Involves quantity of work; time taken for completion of particular process | *A rating of "fair" indicates work was completed in approximate amount of time allowed for beginners in trade |
| 3. Neatness..... | Involves cleanliness of garment, ripping, crumpling | A rating of "fair" in neatness indicates work is only unavoidably soiled, mussed or crumpled. Above or below average as explained |
| 4. Handling..... | Involves dexterity in manipulating material | A rating of "fair" in handling indicates no obvious awkwardness in handling material. Above or below average as explained |
| 5. Grasp of directions..... | Involves ability to carry out given set of directions | A rating of "fair" in grasp of directions indicates ability to carry out idea (regardless of quality) after two explanations |
| 6. Attitude..... | Involves general interest in work, responsiveness, manner of taking suggestions and corrections | A rating of "fair" in attitude indicates a fairly sustained interest in work and a general willingness to "take orders." |

* Average speed for various projects: Machine apron, 15 hours; work bag, 3 hours; work apron, 6 hours; child's drawers, 8 hours; child's petticoat, 9 hours.

Each individual then has two ratings, one on actual work, and one on probable success as, for example,

"fair worker," "will probably succeed as an operator," which expressed numerically is 3–4.

The following is the scale for rating probable success:

| | |
|---|---|
| Will succeed as an operator.....5<br>Will probably succeed..4 | Probable successes |
| Will possibly succeed...3 | Doubtful successes |
| Will probably not succeed.....2<br>Will not succeed.....1 | Probable failures |

The correlation between the weighted score and the judgment rating as calculated by the Pearson formula equals 0.87, almost high enough to warrant their being used interchangeably. In all further discussion, only the judgment rating will be used. This will be considered the criterion.

*Of the 118 subnormal girls in the experimental class, 22 per cent were considered as probable successes, 21 per cent as doubtful successes, and 57 per cent as probable failures.* This seemingly large percentage of doubtfuls will be found by any employment manager—the successes and failures will always stand out after a reasonable time but there will always be a group which will need a longer trial before a decision can be made.

### RELATION BETWEEN VARIOUS KNOWN FACTORS AND ESTIMATES OF ABILITY

An examination of the relation between various known factors and the estimates of ability as machine operators taken as the criterion, shows which factors may be of significance in determining success or failure as a machine operator and which may be used in future for preliminary elimination of failures.

There is not a very high degree of relationship between intelligence as measured on the Terman Revision of the Binet-Simon scale and ability to run an electric power machine, for this homogeneous group. Between mental age and weighted score there is a correlation of 0.37. Between mental age and judgment score there is a correlation of 0.36. The fact that below the 8-year level all are failures except 3, makes possible a preliminary elimination on this basis, with a critical score of 8 years mental age. Approximately 33⅓ per cent of failures would be eliminated by this method, but also 2 successes and 1 doubtful success.

The correlation between intelligence quotient and weighted score is 0.32, and between intelligence quotient and judgment rating 0.35. An intelligence quotient of 50 as critical score would eliminate 16 or approximately 24 per cent of the failures, but would exclude only one success.

The lack of relationship between general intelligence and the ability to operate a garment machine for this group of subnormal girls is borne out by the slight relationship between grade in school and the criterion. There is considerable scattering, with successes in the lower grades but none in the 6B or 7A grades.

Although the higher grades supply a considerably smaller percentage of the failures than the ungraded classes they furnish approximately the same percentage of successes so that no preliminary elimination of ungraded

class girls could be made at the outset.

With few exceptions, organized work on a trade basis was a new experience for most of the group. For the majority, the only industrial experience was the very limited amount offered in the schools. Although the girls in the ungraded classes spend half the day at manual work, this is not organized on a trade basis and most of it has no commercial value in that it does not prepare for future placement.

Of the six girls referred by the Vocational Adjustment Bureau, three had had trade experience, mostly at various forms of packing. This experience at conforming with trade discipline and standards seems to have been of little value as such in learning to operate a power machine. All three of these girls were rated as probable failures.

Nineteen of the girls still in school had done some remunerative work. Ten girls had worked during the summer vacation, all at unskilled work with the exception of one girl who operated a hemstitching machine for one day. These earned from $10 to $12 a week. All left their jobs at the end of the vacation to return to school. Seven girls do home work after school. This is obtained from contractors and is usually participated in by as many members of the family as are capable of doing the work. Four of these girls were rated as probable successes, seven as doubtful successes, and eight as probable failures.

The question of which factors can be used for preliminary elimination of failures leads us to the question of whether or not, as shown by this experiment, ability could have been estimated satisfactorily at any time within the six weeks' period. There is no way of determining this except by a comparison of ratings at various shorter intervals with final ratings.

The ratings for each girl for the first day's work (3 hours) and for the first week's work (15 hours) were correlated with each other and then each one with the final rating (90 hours).

The first two ratings were based on work only (the teacher's judgment did not enter in) and were weighted on accuracy and speed just as the final work score was weighted. The following correlations were obtained:

| | COEFFICIENT OF CORRELATION |
|---|---|
| Weighted score 1st day and weighted score 1 week | 0.75 |
| Weighted score 1st day and weighted score 6 weeks | 0.72 |
| Weighted score 1st week and weighted score 6 weeks | 0.85 |
| Weighted score 1st day and judgment rating 6 weeks | 0.58 |
| Weighted score 1st week and judgment rating 6 weeks | 0.76 |

From this it appears that there is a correlation of over 50 between each two of these ratings. There is less of a relationship between the rating at the end of the first day and either of the others than between the other two. Probably a longer trial than 3 hours is necessary. The high correlation of 0.85 between the first

week's rating and the final work rating indicates that a reliable estimate of an individual's ability might have been obtained at the end of one week of fifteen hours. This rating does not show quite such a high correlation with the 6 weeks judgment rating, but these two are not exactly comparable.

### A TEAM OF TESTS FOR PREDICTING SUCCESS AS A GARMENT MACHINE OPERATOR

At the outset, it was foreseen that if as a result of this experiment it was proved that girls of subnormal mentality could learn to operate an electric sewing machine successfully, and that if it was decided at some time to train some of these girls for this trade, a six weeks' actual trial on the machine would be a long and expensive and perhaps unnecessary procedure. Accordingly, it was decided, while the experiment was still in progress, to devise a team of tests for predicting success or failure that might be given in place of actual trial on the machine.

The work of devising this team of tests was done by Miss Katherine Treat of the Bureau staff, then a student at Columbia University. The work of devising this team of tests and detailed results will be described by Miss Treat in an article to appear in a later issue of this magazine.

The total scores on the team of tests showed a positive correlation of 0.61 with the weighted score criterion and 0.59 with the judgment rating. A preliminary selection on the basis of the total score made on the team of tests with a critical score of 250 would have excluded 45 out of 59 failures or approximately 76 per cent of the failures. Only two successes would have been eliminated. A comparison between the preliminary elimination of failures by a critical score of 8 years mental age and 250 total team score, shows the total team score as more valuable. Between the mental ages of all 101 cases (the number that had complete test scores) and the total team scores for the same number the correlation is +0.60.

A comparison between the preliminary elimination of failures with a critical score of 50 in I.Q. and a critical score of 250 in total team score shows again the superiority of the team score as an elimination measure.

In the number of projects successfully completed, the successes and failures barely overlap. This differentiation is more strikingly brought out by the fact that while of the successes, only 18 successfully completed less than half of the steps attempted, of the doubtfuls there were 50 per cent and of the failures 77 per cent.

It might be interesting at this point to add some new evidence to the results of many recent investigations which have shown that the more accurate worker is the speedier. A correlation between accuracy and speed for the 118 girls tested in this class, based on the final rating received, was 0.83. This, although not quite so high as that obtained by other groups of workers, is very high considering the nature of this work.

Thus it seems that the three groups differ strikingly not only in the quality but also in the range and quantity of work.

In discussing the possibility of using various factors for preliminary elimination of failures, it was shown that there was little relation between intelligence, chronological age, grade in school and nationality, with ability to run an electric sewing machine.

With the exception of the original battery of tests given to the first 58 girls by Miss Treat, no tests for specialized ability other than the five tests of the team were given. The five tests in the team measure such ability as hand, eye, and motor coordination, manual dexterity, comprehension, stability, precision, and speed which are some of the specific abilities required for machine operating. It would appear then from the failure of the critical score charts for individual tests, that no single test measures the specific abilities required for machine operating sufficiently to separate the successes from the failures. The entire team which tests all of the abilities combined is successful as stated above in eliminating 76 per cent of the failures. There are still, however, 14, or 24 per cent of the failures, who failed apparently not because of lack of specific abilities covered by the tests, (they made team scores over 250), but because of the absence of certain other necessary qualities, possibly those usually classified under the head of "personality."

To the knowledge of the writer, to date no short method of evaluating elements of personality satisfactorily has been derived, nor any test or chart method which would reveal, even in a measure, the features revealed through contact with the individual during such a test period as that in this machine operating class.

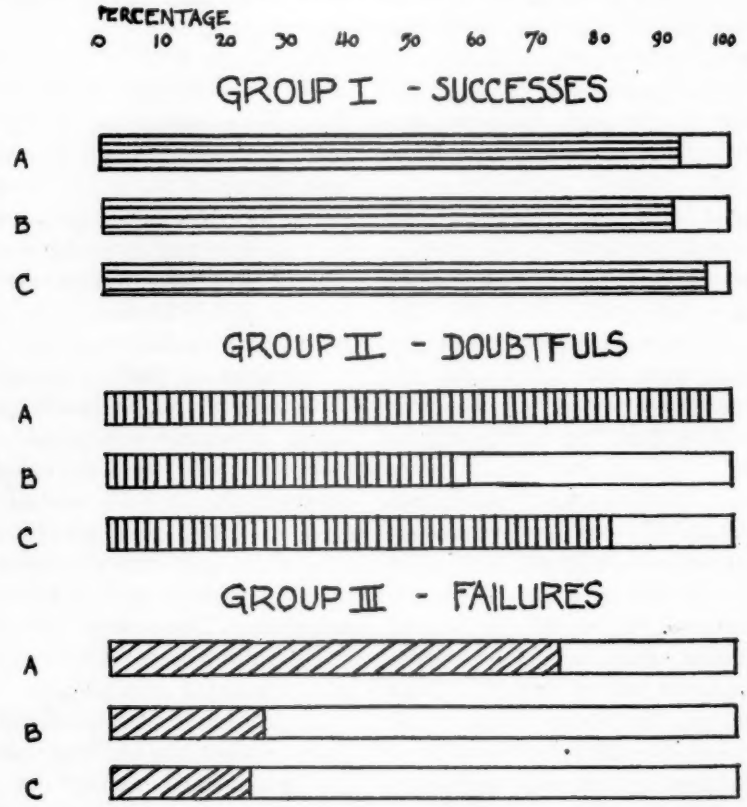
A study of the 26 probable successes in machine operating reveals that only 2 were below 8 years mentally, that only 2 showed any outward signs of mental deficiency and those 2 only to such a slight degree as to appear dull to the trained observer. All but 2 scored average or above on the total team score and these two fell below only slightly.

In all but 4 of the probable successes, the mental retardation was decidedly compensated for by attractive appearance and manner. At least eleven of the probable successes would have compared rather successfully in these respects with a group of normal children. Six of the group were decidedly immature, while eight possessed a maturity of manner well in advance of their physical years. With one exception, each girl possessed a certain emotional stability and evenness of temperament that unquestionably made for success. These girls were able to apply themselves, were quiet and steady, wasting little time in fooling and watching their neighbors. They were all coöperative. Only one might be said to have any personality handicap.

There are, however, 14 girls who, while above the critical scores in intelligence and above the critical score in total team score, and thus apparently possessed of those specific motor abilities measured by these tests, were failures on the machine test. An explanation for their failure must thus be found along other lines. A glance at the records of these fourteen failures shows that five were considered as decidedly institutional cases, so hopeless was the prognosis for success at even the lowest grade of un-

skilled work, three were emotionally unstable, and nine seemed absolutely incapable of that concentration and application that would have turned what manual dexterity they did possess to account. In one case, the work seemed physically a little too strenuous. One of these girls showed unusual ability in drawing for her mental level. Her copy work was good and she showed some originality. Special tests given to her at Teacher's College revealed no possibility of her utilizing this artistic ability industrially.

It would seem then that all the successes except one possessed compensating personalities and that all were emotionally stable and of even temperament, while even those failures who appeared to have sufficient manual dexterity and motor control to make for success, were so low grade, so unstable, or so incapable of concentrated effort as to preclude any possibility of success. The accompanying chart shows graphically the percentages of the three groups, successes, doubtful successes and failures, that are above the standard set for




COMPARISON OF SUBNORMAL GIRLS JUDGED TO BE PROBABLE SUCCESSES, DOUBTFUL, AND PROBABLE FAILURES AT GARMENT MACHINE OPERATING

A = abstract intelligence 8 year level or above
B = specific motor abilities as represented by total team score of 250 or above
C = personality make-up

mental age, specific motor abilities, and personality make-up.

SUMMARY

One hundred and eighteen girls were given an actual trial as machine operators. As a result of this trial,

67 or 57 per cent were judged by the teacher to be probable failures as machine operators,

25 or 21 per cent were judged by the teacher to be doubtful successes as machine operators,

26 or 22 per cent were judged by the teacher to be probable successes as machine operators.

Thus, on the basis of these judgments it is possible to train a certain proportion of subnormal girls for the garment industry. This proportion may be selected by the use of certain facts brought out in this study, all of which bear a relation to capacity for training. No attempt should be made to train for the garment machine trades any subnormal girl (a) with a mental age below 8 years or an I.Q. below 50, (b) who shows visible signs of mental retardation, (c) who shows emotional instability, (d) who has an inferior personality make-up, (e) who achieves a score of less than 250 on the team of tests here described.

(*Manuscript received April 23, 1926*)

# News Notes

*Activities of Member Organizations*

*Research Bureau for Retail Training*

The Research Bureau for Retail Training reports that it has completed the following projects mentioned in the News Notes of the JOURNAL for March, 1926:

Preparation of a manual on department training for sales-people, based on interviews with fifty expert department coaches in regard to specific phases of department training.

Preparation of a bulletin on suggestive selling gathering together all available information on methods of teaching and follow-up.

A study of the use of the "Want Slip" for the purpose of increasing its effectiveness.

Preparation of a book on bonuses in selling and non-selling.

Preparation of "Costume Essentials," a detailed outline to be used by training directors as a basis of a training program for sales people in ready-to-wear departments.

Study of methods of introducing costume information in stores.

Compilation of mimeographed folders for distribution to ready-to-wear salespeople on "Distinctive Vocabulary," "Methods to be Used in Teaching Vocabulary," and "Fall Colors."

Instructions for teaching lettering.

In addition the Bureau has completed a study entitled "Problems in Teaching Retail Selling in High Schools," which alone of all its studies is available for general distribution.

The study of the returned goods evil has been continued more intensively with the aid of skilled interviewers and Hollerith tabulating machines. The report of this study, which comprises over 2000 personal interviews with customers of department stores in Pittsburgh, will be ready shortly.

A manuscript of a book describing the methods used in the studies of the Bureau from the time of its founding up to the present is ready for publication and should be off the press sometime during the winter.

Other projects now under way are:

1. A study of the cost of pension plans in department stores.
2. The collection and standardization of experience questions for applicants for non-selling employment.
3. A revision of currently used rating scales in the light of a statistical summary of over 2000 scales.
4. Standardization of work and measures of production in non-selling departments.
5. A program and a technique for training juniors.
6. Manual of store correspondence.
7. The employment and training of contingents.

The Bureau has recently added two more stores to its Extension Division—James A. Hearn Company in New York and the Kresge Department Store, formerly L. S. Plaut and Company, of Newark, N. J. This makes a total of 16 stores in the Extension Division and 9 in Pittsburgh. The total annual volume of business of these stores is over $300,000,000.

*White Motor Company*

The White Motor Company reports that it is undertaking the following studies:

1. The evaluation of the personal history items on the salesman's application blank for purposes of employment.

2. The study of the promotion and progress of all college men in the organization who have risen above minor jobs.

3. The investigation of the duties of repair mechanics with special reference to tests for selection and use of special methods and tools. It is planned to conduct labora-

tory experiments in order to reduce the time of making repairs.

4. Collection of information on employee representation, group insurance, etc.

*Federal Board for Vocational Education*

The present research activities of the Board are as follows:

1. The development of a course for the training of conference leaders to conduct foremen's conferences largely on the human relations side of their work.

2. The development of graduate summer school courses which will deal with the principles and practices of personnel management as they apply in the work of the administrator, the supervisor, and the vocational instructor.

The first piece of research work is being carried through by working in coöperation with a group of men who have been markedly successful in the field of foremanship training. The second research is being carried on in coöperation with several agricultural colleges, particularly the Colorado State Agricultural College.

*Safety Congress*

The Fifteenth Annual Safety Congress will take place October 25th to 29th at Detroit. Meetings which include presentation of papers and discussion are planned for each of the following sections: Automotive, Cement, Chemical, Construction, Electric Railway, Employee's Benefit Associations, Food, Marine, Metals, Mining, Packers and Tanners, Paper and Pulp, Petroleum, Plant Publications, Public Safety, Public Utilities, Quarry, Rubber, Steam Railroad, Taxicab, Textile and Woodworking. Many speakers of national prominence are scheduled for these meetings. A safety exhibit will be held in conjunction with the Congress.

*International Association of Psychology and Techno-psychology*

An international association of applied psychology, with representation in nineteen European countries, was formed in March of this year. The activities of the association concern the solution of any important question of applied psychology. Membership includes persons who are active in psychology or its applications in industry, commerce, traffic, management, or training.

Active centers exist in Austria, Belgium, Czechoslovakia, England, Esthonia, Finland, France, Germany, Holland, Hungary, Italy, Lettland, Norway, Rumania, Russia, Spain, Sweden, and Switzerland. Headquarters in charge of Dr. Möller are at Riga, Lettland, where a monthly circular is issued.

The German center has taken as its first task the compilation of a list of German firms using psychological tests. It is understood that similar lists are being compiled for other European countries. Announcement of this list appears below.

*Vocational Testing in Germany*

*Industrielle Psychotechnik* for August, 1926, gives a list of German firms using employment tests. The following information is given for each firm: Name of firm, address, year tests were installed, whose tests are being used, name of man in charge of tests, occupations for which the tests are being used, number tested annually, and references to published work on these tests. The report covers 107 firms. This is an invaluable list for every personnel research worker who is experimenting with employment tests in industry.

*Courses in Physiotherapy at Columbia University*

"Three courses in physiotherapy, designed to reduce time lost as a result of accidental injuries to workmen, are announced by Columbia University. They will be given this fall at the Reconstruction Hospital, Central Park West and 100th Street.

"There are yearly between 2,500,000 and 3,000,000 accidents, each resulting in the loss of more than one day's working time. The total loss aggregates between 225,000,000 and 300,000,000 days, which at $4 a day figures to upward of a billion dollars. In New York State alone there

were 2,308,844 weeks disability in a single year for which compensation was paid under the Workmen's Compensation Act.

"The three courses include one for medical graduates, another for graduate nurses and a third for industrial surgeons."—*New York World.*

### *Bulletin on Employment Management*

The Bureau of Business Research of Ohio State University has issued a special bulletin by Willis Wissler entitled *Employment Management.* This is the first of three bulletins on Labor Management; the other two will be on *Labor Maintenance* and *Labor Administration.*

These bulletins are being sent in mimeographed form to experts in the field of personnel research, with requests for criticisms. It is planned to revise and print them at a later date.

### *Measurement and Testing of Commercial Achievement*

Measuring and testing achievement in all commercial subjects is one of the functions of the Research Committee in Business Education, appointed at the National Education Association meeting in Philadelphia. Perhaps no other phase of education has attracted more attention in recent years than measurement and testing. In commercial education, however, there has been no organization for outlining, centralizing, directing, and stimulating measurement and testing. The appointment of this research committee marks the beginning of such an organization.

Every commercial teacher can coöperate with this committee in any of all of the following ways:

1. Report such research as he has carried on and is carrying on in all commercial subjects.
2. Report the names and addresses of teachers who have constructed any tests in commercial subjects.
3. Report the names and addresses of teachers who are now constructing and experimenting with tests in commercial subjects.
4. Report the names and addresses of teachers who might assume the responsibility of stimulating and directing research activities in a particular subject.

Communications for the committee should be addressed to Ann Brewington, School of Commerce and Administration, University of Chicago, Chicago, Illinois.

### *Factory Labor Turnover*

The Metropolitan Life Insurance Company offers a useful service to personnel officers who are concerned with labor turnover. Each interested firm submits a monthly report. This information is pooled in the Policyholders Service Bureau of the Metropolitan Life Insurance Company and a report such as the one below is sent to each firm which contributes figures.

Company Code No. HI 43.71

FACTORY LABOR TURNOVER IN MAY, 1926

*Your Company's Figures Compared with the Composite Average for All Reporting Companies*

(All figures represent monthly percentages of number on payroll)

| | *Your Company* | *Average* |
|---|---|---|
| I. All Separations | 6.4% | 4.0% |
| (a) Voluntary Quits | 4.7% | 2.4% |
| (b) Discharges | 1.0% | 0.6% |
| (c) Layoffs | 0.7% | 1.0% |
| II. All Accessions (including both first employment and rehires) | 6.7% | 3.8% |

Thus an employer is able to determine to what extent his production and labor fluctuations are due to the condition of his own establishment and to what extent they are due to the general state of business. Over eighty manufacturers are reporting this information.

# Testing Apprentices for the Burroughs Adding Machine Company

By Alex. C. Crockett, *Detroit Public Schools**

*Mr. Crockett's study of lists for apprentices is a step in the direction that has been successfully followed by European investigators. We hope this article will stimulate some favorably situated research workers to give a trial in American shops to some of the mechanical aptitude tests which have been devised in Germany and England.*

THE Burroughs Adding Machine Company of Detroit, employing over four hundred tool and die makers, has found that mistakes in selecting apprentices are costly. It is costly to the company employing the men, and it is also costly to the men employed by the company. The present study was suggested by the Placement Division of the Detroit Public Schools as a possible means for improving the technique of selection, and, at the same time, reducing the cost. If this could be done the Burroughs Company would benefit by securing applicants with good native ability, and the Placement Division would benefit by the scientific standards which might be used as an aid in vocational counseling and in placement work, with reference to the tool and die making trade.

## TESTING THE PRESENT APPRENTICES

It was decided to test the 27 members of the Burroughs apprentice school, and set a tentative standard for new applicants. The test results were to be used in two ways. First, they were to be compared with the results of previous tests given to an unselected group of sixteen year-old applicants for employment. It might then be shown to what extent the Burroughs group was superior or inferior in any or all of the capacities tested. Secondly, the test results might be used to select the best apprentices from the poorest. For this purpose some criterion of success was needed. It was planned to have three individuals who knew the apprentices through association and observation of past experience rate them on mechanical skill. The criterion would then be the average of the three ratings. The ratings were to be made independently and without recourse to the test results. The test results were to be further evaluated by a comparison with (1) the previous schooling and (2) the time served with the company.

As a result of the experiment the tests could be sifted out and possibly

* The writer wishes to express appreciation to Dr. C. H. Griffitts for valuable assistance in the preparation of this study.

augmented. As time passed and the ability of the apprentices became more apparent the prognostic value of the tests could better be determined.

PROCEDURE

*Arrangements for testing.* The management provided a private room, with two tables and a screen between to accommodate two boys at a time. The purpose of the testing was explained to each boy; in effect, to try to establish a standard for hiring new apprentices. In general, satisfactory interest and effort were observed. The testing was begun February 23, 1926, and continued for nine afternoons through March 8, 1926. The complete series of tests for each subject required from one to one and one-half hours.

*Tests used.* The tests used were: (1) tapping for motor speed (pencil and paper), two trials; (2) card sorting for quickness of judgment (Link), three trials: (4) follow directions (test 1 of the Army Alpha, form 6), two trials; (8) rote memory (writing digits backward in response to auditory presentation), three trials; (10) form board for manual dexterity (writer), three trials; (13) Stenquist mechanical ingenuity (form A) one trial; (14) matchboard for motor control (Griffitts), six trials;[1] hand measurements in millimeters (length of hand, length of middle finger, and width of hand.) These tests were selected on the basis of a psychological analysis of the operations required in the tool and die making trade. The tests were given with standardized instructions.

TABLE 1

*Norms for Burroughs group. These norms were obtained by adding and subtracting values of S. D. and P. E. with reference to the mean*

| Test number | 1 | 1 | 2 | 2 | 2 | 4 | 8 | 10 | 10 | 10 | 13 | 14 | 14 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trials | 1 | 2 | 1 | 2 | 3 | 1 | 1-3 | 1 | 2 | 3 | 1 | 1 | 3 | 6 |
| Measures: | | | | | | | | | | | | | | |
| M+2 P.E. | 184 | 188 | 70 | 72 | 75 | 11 | 80 | 120 | 106 | 106 | 113 | 54 | 60 | 63 |
| M+S.D. | 179 | 183 | 66 | 68 | 71 | 10 | 72 | 114 | 101 | 102 | 106 | 52 | 58 | 61 |
| M+P.E. | 175 | 178 | 62 | 64 | 67 | 9 | 65 | 107 | 96 | 97 | 101 | 50 | 56 | 60 |
| Mean | 165 | 169 | 54 | 56 | 60 | 3 | 49 | 95 | 85 | 88 | 89 | 46 | 52 | 56 |
| M−P.E. | 156 | 159 | 47 | 48 | 52 | 7 | 33 | 82 | 75 | 79 | 78 | 43 | 48 | 53 |
| M−S.D. | 151 | 154 | 43 | 44 | 48 | 6 | 26 | 76 | 70 | 74 | 72 | 41 | 47 | 51 |
| M−2 P.E. | 147 | 149 | 39 | 40 | 44 | 5 | 18 | 70 | 65 | 70 | 66 | 39 | 45 | 49 |
| S.D. | 13.8 | 14.3 | 11.5 | 12.2 | 11.5 | 2.1 | 23.2 | 18.7 | 15.4 | 13.6 | 17.2 | 5.3 | 5.5 | 5.3 |
| N | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 |

[1] Further mention of these measurements is omitted since no relationship was shown with the criterion of success, and no critical scores could be set.

The reliability coefficients for the above tests (last two trials correlated) are:

| | |
|---|---|
| (1) tapping | +0.77 ±.05 |
| (2) card sorting | +0.91 ±.02 |
| (4) follow directions | +0.58 ±.08 |
| (8) rote memory | +0.89 ±.02 |
| (10) form board | +0.52 ±.09 |
| (13) [2]Stenquist | +0.60 ±.02 |
| (14) matchboard | +0.86 ±.03 |
| Average | +0.73 ±.04 |

TABLE 2

*Norms for unselected group. These norms were developed as in table 1*

| Test number | 1 | 1 | 2 | 2 | 2 | 4 | 8 | 10 | 10 | 10 | 13 | 14 | 14 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trials | 1 | 2 | 1 | 2 | 3 | 1 | 1-3 | 1 | 2 | 3 | 1 | 1 | 3 | 6 |
| Measures: | | | | | | | | | | | | | | |
| M+2 P.E. | 185 | 196 | 63 | 73 | 77 | 9 | 81 | 149 | 108 | 95 | 91 | 47 | 52 | 57 |
| M+S.D. | 180 | 189 | 60 | 69 | 73 | 8 | 72 | 140 | 103 | 91 | 83 | 45 | 51 | 55 |
| M+P.E. | 172 | 183 | 56 | 66 | 69 | 7 | 63 | 132 | 98 | 87 | 76 | 43 | 49 | 54 |
| Mean | 159 | 170 | 50 | 58 | 61 | 5 | 45 | 115 | 88 | 79 | 61 | 39 | 46 | 50 |
| M−P.E. | 146 | 157 | 43 | 50 | 54 | 3 | 27 | 98 | 78 | 71 | 46 | 35 | 43 | 47 |
| M−S.D. | 138 | 151 | 40 | 47 | 50 | 2 | 18 | 90 | 73 | 67 | 38 | 33 | 42 | 45 |
| M−2 P.E. | 133 | 144 | 37 | 43 | 46 | 1 | 9 | 81 | 68 | 63 | 31 | 31 | 40 | 43 |
| S.D. | 20.9 | 19 | 9.6 | 11.4 | 11.7 | 2.8 | 27 | 25 | 15 | 12 | 22.4 | 5.7 | 4.4 | 5.1 |
| N | 164 | 78 | 296 | 125 | 97 | 33,129 | 126 | 88 | 88 | 80 | 909 | 48 | 48 | 26 |

*Description of group to be tested.* The 28 members of the Burroughs school range in age from 16 years to 22 years, with a median age of 19, and an average deviation of 1 year. Schooling ranges from the eighth to the twelfth grades, with a median of 10, and an average deviation of 1. The time served with the company ranges from one month to thirty-six months, with a median time of 16, and an average deviation of 8.

*Criterion of success.* The superintendent, the apprentice supervisor, and the foreman were asked to rate the apprentices in accordance with the following instructions:

> Rate the boys 1 (good), 2 (average), or 3 (poor) in mechanical ability (not mental ability). By mechanical ability is meant the knack or gift of understanding mechanical relationships, and the ability to put things together or take them apart with the least effort and in the best possible way.

The paper carrying these instructions had three columns headed from left to right, "good (25 per cent of boys), fair (50 per cent of boys), and poor (25 per cent of boys)." This arrangement helped to distribute the ratings more nearly like the normal frequency distribution.

[2] Taken from the Manual of Directions for this test.

The reliability coefficients of the ratings as expressed in terms of intercorrelations are:

| | | |
|---|---|---|
| Superintendent with supervisor | r | +0.69 ±.06 |
| Superintendent with foreman | r | +0.57 ±.08 |
| Supervisor with foreman | r | +0.66 ±.07 |
| Average | r | +0.64 ±.07 |

COMPARISON OF THE TWO GROUPS

*Measures of the Burroughs group.* Table 1 pictures the Burroughs group in terms of the mean, the standard deviation and the probable error. The values of S. D. and P. E. are added and subtracted with reference to the mean to establish the norms.

*Measures of the unselected group.* Table 2 pictures the unselected group in the same terms that are used in table 1.

*Group differences in mean or average of scores.* The average scores of the Burroughs group are higher than those

TABLE 3

*Correlations between the tests and criteria of success*

| | | TAPPING (1) | CARD SORTING (2) | FOLLOW DIRECTIONS (4) | ROTE MEMORY (8) | FORM BOARD (10) | STENQUIST (13) | MATCHBOARD (14) | WEIGHTED TESTS |
|---|---|---|---|---|---|---|---|---|---|
| Combined ratings | r | −0.04 | +0.16 | +0.29 | −0.10 | +0.35 | +0.09 | +0.10 | +0.18 |
| | P.E. | ±0.12 | ±0.12 | ±0.11 | ±0.12 | ±0.11 | ±0.12 | ±0.12 | ±0.12 |
| Time with company | r | +0.02 | +0.25 | +0.29 | −0.18 | +0.10 | +0.18 | −0.00 | +0.16 |
| | P.E. | ±0.12 | ±0.12 | ±0.11 | ±0.12 | ±0.12 | ±0.12 | ±0.12 | ±0.12 |
| School grade | r | ±0.12 | −0.11 | +0.25 | +0.39 | +0.30 | +0.05 | −0.04 | +0.24 |
| | P.E. | ±0.12 | ±0.12 | ±0.12 | ±0.10 | ±0.11 | ±0.12 | ±0.12 | ±0.12 |

TABLE 4

| TEST NUMBER | RELIABILITY | EXTENT OF GROUP DIFFERENTIATION IN AVERAGES | EXTENT OF GROUP DIFFERENTIATION IN RELATIVE VARIABILITY | EXTENT OF CORRELATION WITH CRITERION | VALUE OF TEST IN THIS BATTERY |
|---|---|---|---|---|---|
| 1 | High | None | None | None | Poor |
| 2 | Very high | None | None | Some | Poor |
| 4 | Fairly high | Considerable | Some | Some | Good |
| 8 | Very high | Some | Some | None | Poor |
| 10 | Fairly high | Some negative | None | Some | Fair |
| 13 | Fairly high | Considerable | Considerable | None | Good |
| 14 | Very high | Considerable | Some | None | Good |
| Weighted tests | | | | Some | |

As we have indicated, this study aimed to do two things: (1) to show significant differences between the two groups in question, and (2) to distinguish between the best and poorest apprentices.

of the unselected group in tests number 4, 8, 10, 13 and 14. There are significant differences in tests 4, 13 and 14. The critical scores (below which no Burroughs apprentice score is found) for these last three tests are 4, 60 and 46 respectively. The significant differences are brought out in Figure 1, which gives curves based upon the mean, S. D., and P. E.

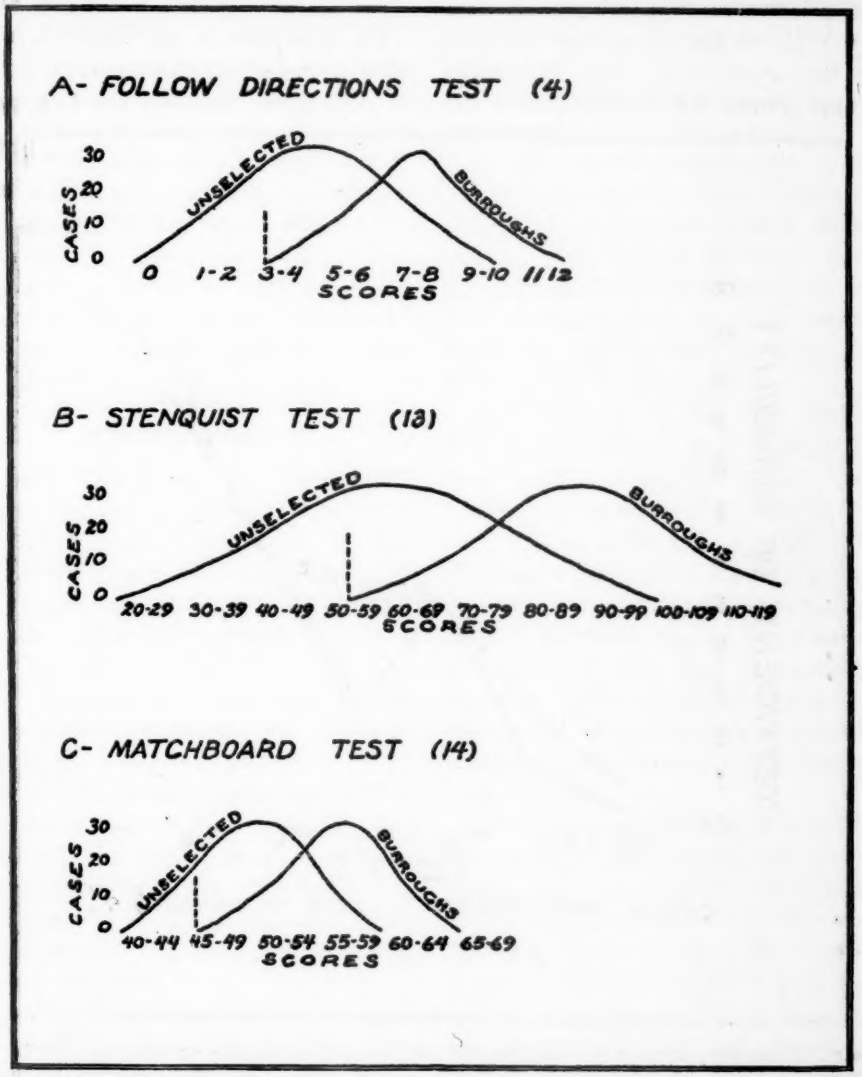



FIG. 1. Theoretical curves based upon the mean, standard deviation, and probable error showing the extent to which these tests differentiated between the Burroughs group and the unselected group. The critical scores are indicated by the dotted line.

*Group differences in relative variability.* Significant differences in averages

are more important when accompanied by low variability. Figure 2 compares the relative variability (mean divided by S. D.) of the two groups for each of the seven tests. The Burroughs group proves less variable than the unselected group in five tests, and practically the same in two.

The tests which bring out the greatest differences in variability are 1, 4, 8, 13 and 14. Of these, 1 and 13 show the most extreme differences.

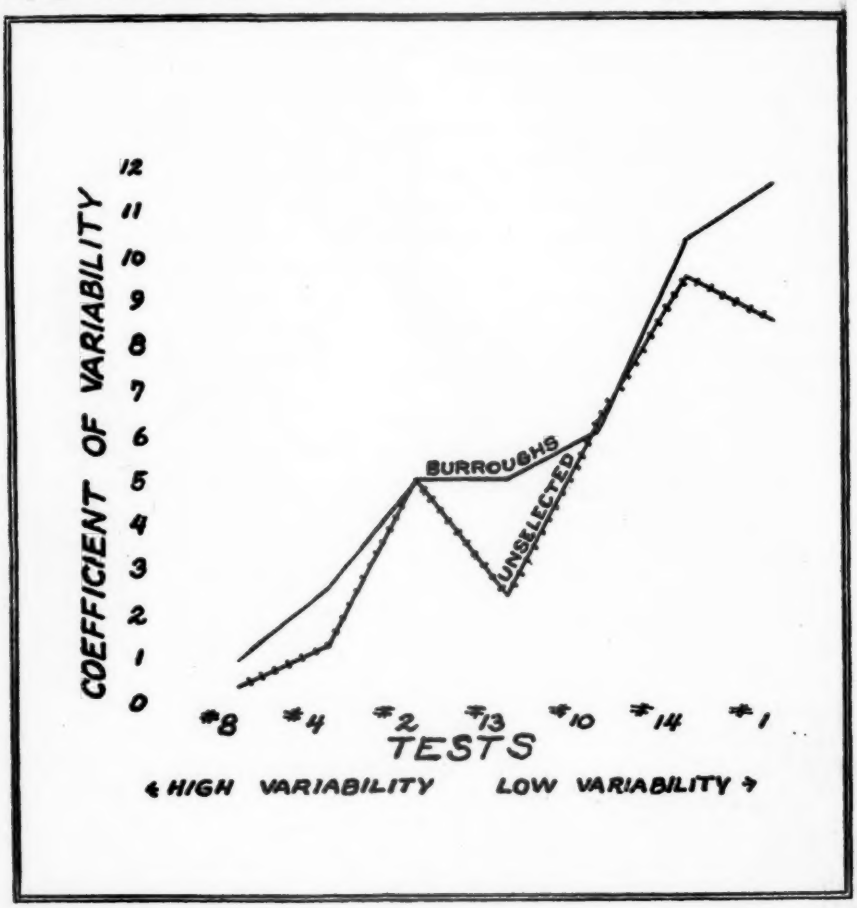



FIG. 2. Showing differences between the two groups in relative variability. Tests 14 and 1 show low variability. Tests 8 and 4 show high variability. The variability coefficients were computed by dividing the mean by the standard deviation.

### DISTINGUISHING BETWEEN BEST AND POOREST APPRENTICES

An examination of Table 3 will show that no test can be relied upon to distinguish between the best and poorest apprentices. Neither can the combined tests serve this purpose. With tests 4 and 10 and with the combined tests there is a low correlation, but the probable error is too large for any sound conclusions.

In fact the relationships between the tests and the best and poorest apprentices are no closer than the relationships between the tests and the length of time served with the company, and between the tests and the school grade. This lack of relationship with time served and school grade is what we should expect from the nature of the tests, which were selected for the most part to test mechanical skill. It will be noted that what relationship does exist between the weighted tests and schooling and time served is positive.

## CONCLUSIONS

*Evaluation of the tests.* In a study depending so largely upon tests as does the present one a critical consideration of such tests seems essential. The tests must meet definite requirements. The requirements used in the present case are:

1. That the test must show a high reliability coefficient, or self-correlation.
2. That the test must show a variability that is at least the same and preferably lower when given to the selected group than the variability when given to the unselected group with which the selected group is being compared.
3. That the test must show a higher average for the selected group than for the unselected group.
4. That the test should tend to correlate with the criterion of success.

These requirements are based on the assumption that the selected group is actually superior (in the capacity being studied) to the unselected group. We have reason to believe that this is the case in the present study.

In table 4 each test is judged according to the requirements above mentioned.

The judgments expressed in the last column of table 4 are based solely upon the objective test scores.

The experienced tester observes numerous qualitative factors which enhance the value of the test. Such factors contribute considerably to the final interpretation of test results. They are, however, held to be outside of the scope of this paper.

*Evaluation of results.* The results of this study should be judged by the two purposes originally stated. The results are positive in so far as the tests have definitely marked the Burroughs group as a superior group, and established critical scores in three tests. The test results represent a new kind of data, and, when taken together with interview data, biographical data, and school records, should tend to raise the standard as time goes on.

The results are indifferent in so far as the tests failed to differentiate between best and poorest apprentices. There are several reasons for this. The apprentice group is already selected. The criterion of success was, at best, an opinion given by observers who might not have kept the single factor of mechanical skill in mind. Consequently mechanical skill was inevitably blended with outstanding character traits such as willingness, initiative, ingenuity, and application. We know also that the estimates were influenced by the time served with the company. The correlation between

these two factors is $+0.46 \pm 0.11$. It is suggested that a more exact method of rating the apprentices might raise the coefficients.

*Practicability of extending the procedure in this and other occupations.* Experience with this investigation indicates that the public school personnel office is a desirable agency for conducting similar investigations in this and other occupations. The data can be independently evaluated, accumulated, studied, and given out to other investigators for comparison and verification. Such data are needed by employment managers and are of particular value for scientific vocational guidance. In fact until vocational guidance is based upon objective scientific findings little practical value will come of it. This study is submitted as an example of what cooperation between industry and education can do. It is not final and demonstrates that further research is needed.

SUMMARY

1. The purpose of this study was to try to establish psychological standards for hiring apprentices for tool and die making work, and to gather data for vocational guidance.

2. The plan was to test the 27 members of the Burroughs apprentice school.

3. Tests were selected for this purpose. The average reliability coefficient of these tests was $+0.73 \pm 0.04$.

4. The members of the group averaged 19 years of age, 10th grade schooling, and 16 months with the company.

5. The criterion of success was the average rating on *mechanical skill* made by three individuals.

6. Three of the tests succeeded in differentiating between the apprentices and an unselected group of working boys of approximately the same age. Critical scores were established. The tests failed to point out the best apprentices and the poorest. In some cases there was a low correlation but the probably error was large.

7. The results justify extending this investigation and making similar studies in this and other occupational fields.

*(Manuscript received June 16, 1926)*

# "Stereotypes": A Source of Error in Judging Human Character

By Stuart A. Rice, *University of Pennsylvania*

*Dr. Rice has approached from a new angle the subject of judgments of personality. By studying classifications of individuals made from their photographs, he has demonstrated preconceived notions of the physical appearance of members of a certain race, class, occupation, or social group. Further analysis shows the reasons for these judgments. Dr. Rice has made a contribution of importance to the study of personality types and human relations.*

THE extent to which character and intelligence are revealed in human features has been made the subject of various experiments in which photographs of unknown persons have been graded by a number of examiners. Hollingworth compared the average deviation of such judgments with the chance deviation in the case of such graded traits as intelligence, perseverance, kindness, conceit, courage, humor, and deceitfulness.[1] In a similar list of traits, the rankings based on photographs were compared with the judgments upon the same individuals made by persons to whom the latter were known. Correlations between the two sets of estimates were presumed to provide a measure of the reliability of the first set. Pintner,[2] Anderson,[3] and others have employed similar methods, in particular comparing the results of intelligence tests with estimates of intelligence based upon photographs.

On the basis of her own material, Downey[4] says:

> When a series of portraits of famous but unrecognized philosophers and good-looking but commonplate pedagogues are arranged in order of merit for intelligence, the commonplace man frequently outranks the great one. Condillac, great psychologist, and Comte, great philosopher, fall quite at the end of the group in the average

[1] Hollingworth, H. L.: *Judging Human Character*. New York, Appleton & Co., 1923, p. 34 ff. *Vocational Psychology*. New York, Appleton & Co., 1916, p. 43 and passim.

[2] Pintner, R.: *Intelligence as Estimated from Photographs*. Psychological Review, 1918, Vol. 25, pp. 286–296.

[3] Anderson, L. D.: *Estimating Intelligence by Means of Printed Photographs*. Journal of Applied Psychology, 1921, Vol. 5, pp. 152–155.

[4] Downey, J. E.: *The Will-Temperament and Its Testing*. Yonkers-on-Hudson, World Book Co., 1923, pp. 36–37.

judgment by psychology students. By the use of photographs it should be possible to get some notion of the popular conceptions that bias social judgment.

The last sentence of this excerpt suggests a factor to which insufficient attention appears to have been given in experiments of the kind cited. What Lippmann calls "stereotypes" or "pictures in our heads"[5] concerning the supposed appearance of individuals of a certain race, class, occupation, or social group, may determine to which of these groups the original of a photograph is unconsciously referred by the examiner. The supposed grouping or type in turn suggests the temperamental or intellectual qualities which are believed to characterize it. It is probable that such stereotypes are largely dependent upon superficial ear-marks as the cut of the hair, the mode of wearing the collar and tie, and other modes of dress.

The experiments described below were designed to show the existence of stereotypes concerning the supposed appearance of persons of various social types, or having defined social functions. These were undertaken originally for purposes of class-room illustration. The participants in various phases of the experiments were, first, 258 undergraduates of Dartmouth College, in small classes, over a period of two years. Subsequently, the assistance of 31 members of the Norwich Vermont Grange, attending a regular meeting, was procured to provide comparative results.

[5] Lippman, Walter: *Public Opinion*. New York Harcourt Brace & Co., 1922, Parts I and III, passim, especially pp. 15, 29, 30, 79, and 80.

In an edition of the Boston Herald for December 15, 1924, were found nine portraits of persons represented in the day's news. The reproductions were unusually clear and were uniformly about two by three inches in size. They were placed without identification upon a sheet of paper and numbered from 1 to 9. The individuals pictured were as follows: Edouard Herriot, at that time Premier of France; James Duncan, Vice-president of the American Federation of Labor; Leonid Krassin, first Ambassador of the Soviet Government at Paris; Joseph W. McIntosh, Deputy Comptroller of the Currency; Martin H. Glynn, former Governor of New York; Max Agel, arrested as a bootlegger; Charles M. Schwab, of the United States Steel Corporation; Howard Heinz, manufacturer of food products; and Senator George Wharton Pepper, of Pennsylvania. In the first aspect of the experiment, the subjects were informed that the sheet contained the pictures of a bootlegger, a European premier, a bolshevik, a United States Senator, a labor leader, an editor-politician, two manufacturers, and a financier. They were asked to identify these individuals by number. Care was taken that no suggestion be given in the instructions concerning the order of the photographs, and that each examiner make independent selections for each position. Table 1 gives the result of the attempted identifications by 141 students. The numbers are not uniform in each column for the reason that in a few cases the pictures were known to the examiners, while in a few others no identifications were attempted.

Allowing for the fact that *two* manufacturers were included among the portraits, the total number of correct identifications on a chance basis would have been approximately 168. The actual number of correct identifications was almost exactly double that number, or 337 out of a possible 1224. On a scale between the expected or chance number and respective status in a number of cases substantially above the chance number. Krassin, McIntosh, and Pepper were below or equal to chance or expectation.

In the case of Krassin, the Soviet Envoy, a wing collar, Van Dyke beard and moustache contribute to an appearance that may be described as distinguished, and which no doubt

TABLE 1

*Identifications by 141 students*

Attempted identifications from their photographs of the social type or functions of nine men, the nine types or functions represented being known

| PERSON PICTURED | IDENTIFIED BY THE NUMBER OF MEN STATED AS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Premier | Labor leader | Bolshevik | Financier | Editor-politician | Bootlegger | Manufacturer* | Senator | Total | Chance* |
| Premier Herriot | 54 | 11 | 55 | 2 | 3 | 4 | 4 | — | 133 | 15 |
| Labor Leader Duncan | 29 | 25 | 15 | 13 | 14 | 1 | 30 | 9 | 136 | 15 |
| Soviet Envoy Krassin | 31 | — | 9 | 15 | 11 | — | 16 | 59 | 141 | 16 |
| Financier McIntosh | 7 | 20 | 14 | 15 | 16 | 24 | 33 | 8 | 137 | 15 |
| Editor-Governor Glynn | 6 | 20 | 5 | 21 | 31 | 2 | 33 | 14 | 132 | 15 |
| Bootlegger Agel | 1 | 6 | 9 | 4 | 11 | 86 | 18 | 2 | 137 | 15 |
| Manufacturer Schwab | 1 | 14 | 4 | 18 | 20 | 2 | 56 | 21 | 136 | 15 |
| Manufacturer Heinz | 5 | 19 | 6 | 31 | 16 | 6 | 46 | 10 | 139 | 15 |
| Senator Pepper | — | 22 | 15 | 16 | 19 | 11 | 35 | 15 | 133 | 15 |

* The column headed *chance* represents the number of identifications that would be expected in each column on a chance basis. An exception is the column headed *manufacturer*. Since there were two photographs combined under this heading, the chance here would in each case be double the number for the other columns.

the maximum possible number of correct identifications, the excess number of correct identifications was 169 out of 1056, or 16 per cent. However, such a measure as this percentage provides would not give comparable results as between different series of portraits.

Interest attaches to the fact that Herriot, Duncan, Glynn, Agel, Schwab and Heinz were related each to his

led to 59 identifications as the United States Senator, in comparison with 9 as a bolshevik and none as a labor leader. Senator Pepper received as many or more identifications as labor leader, bolshevik, financier, editor-politician, and manufacturer than he received in his own senatorial capacity. The largest number of correct identifications was made in the case of the alleged bootlegger. This indi-

vidual alone among his associates in the gallery, is pictured in out-door costume. He is shown in a heavy overcoat with up-turned collar, a cap, tortoise-shell glasses and cigar gripped firmly between his lips. It is interesting that while Mr. Duncan was identified by 25 men as the labor leader, he was selected by 29 as the premier, by 30 as a manufacturer, by 15 as a bolshevik and 13 as the financier. It is evident that he did not fit definitely into any pronounced stereotype among those called forth by the characters enumerated.

When a comparison of the preceding data is made with that obtained from the group of grange members and presented in table 2, the correspondence is seen to be fairly close. Among the latter the total number of correct identifications on a chance basis would have been 29½ out of a possible 219. The correct identifications actually number 58, or again almost exactly twice the expectation. Herriot, Agel, Schwab and Heinz, as among the students, were correctly identified in more than the chance number of cases, while the distribution in other respects shows a close parallel, especially in the high proportions of correct identifications of the bootlegger, and incorrect identifications as Senator of the Bolshevik envoy.

It is evident that some measure of the extent to which opinion has concentrated in the identification of each portrait would be useful. Wherever there is concentration among the identifications, whether these be correct or incorrect, there will be evidence of the existence of a common stereotype concerning the social designation to which the portrait is assigned. Such a measure has been found by

TABLE 2

*Identifications by 25 grange members*

Attempted identifications from their photographs of the social type or functions of nine men, the nine types or functions represented being known

| PERSON PICTURED | IDENTIFIED BY THE NUMBER OF MEMBERS STATED AS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Premier | Labor leader | Bolshevik | Financier | Editor-politician | Bootlegger | Manufacturer* | Senator | Total | Chance* |
| Premier Herriot | 8 | 3 | 14 | — | — | — | — | — | 25 | 3 |
| Labor Leader Duncan | 10 | 1 | 3 | 2 | 3 | — | 3 | 2 | 24 | 3 |
| Sovier Envoy Krassin | 1 | 1 | — | 1 | — | — | 2 | 21 | 26 | 3 |
| Financier McIntosh | — | 8 | 4 | 3 | 4 | — | 5 | — | 24 | 3 |
| Editor-Governor Glynn | 2 | 5 | — | 3 | 3 | — | 9 | 1 | 23 | 2½ |
| Bootlegger Agel | — | 1 | 1 | 1 | 1 | 22 | — | — | 26 | 3 |
| Manufacturer Schwab | — | 3 | 1 | 4 | 3 | — | 12 | — | 23 | 2½ |
| Manufacturer Heinz | 1 | 1 | — | 7 | 4 | 2 | 8 | 1 | 24 | 3 |
| Senator Pepper | 2 | 2 | 1 | 5 | 3 | 2 | 8 | 1 | 24 | 3 |

* Consult note to Table 1, which has the same application here.

calculating in the case of each photograph the total and the relative differences between the numbers of identifications made for each social designation (i.e., under each column in tables 1 and 2) and the corresponding numbers that would be expected on the basis of chance. For example, the chance number of identifications for Premier Herriot in each column of table 1 would be 15. The differences between the chance and the actual numbers of identifications are respectively 39, 4, 40, 13, 12, 11, 26 and 15. These total 160. But since the chance number in the case of each portrait is derived from the total number of identifications of that portrait and is a function of the latter, the aggregate number of differences so determined may be related in each case as a numerator to the total number of identifications as a denominator. This fraction, when converted to a decimal figure, will provide a relative *index of departure from expectation*. This index will serve one of the purposes of a *coefficient of variation*, for by its use it is possible to compare the relative concentration of opinion concerning each portrait in the two groups providing data.[6]

In table 3, there is shown for each group the total departures from chance expectation, the indexes of departure from expectation, and the rank of the nine portraits according to the latter. It will be noted that a high total departure and a high index within each group, and a high index in either group, denote a relatively high degree of concentration of opinion, i.e., of agreement among the examiners.

When the corresponding indexes shown in table 3 are compared it is observed that in each case those for the grange group are higher. This indicates that within the latter there is a greater concentration of opinion. If the thesis of this article is correct, it indicates that members of the grange are more prone to form their identifications upon the basis of stereotypes than are the students.

The order of rank among the nine portraits in the matter of concentration of opinion is closely similar in the two groups. When correlated by the

[6] The *index of departure from expectation* is actually a coefficient of variation, based upon a mean deviation. This may be seen by plotting the data in any row of tables 1 or 2. Let the nine numbers of identifications be regarded as nine frequencies, each with a value corresponding to its magnitude. In the case of Premier Herriot in table 1, for example, the $X$ axis will contain values ranging from 0 (number of identifications as Senator), to 54 (number of identifications as Premier). By classes there will be six frequencies of a value 0 to 9 (there are two manufacturers), one frequency of a value 10 to 19, and two frequencies of a value 50 to 59. The mean value will be 15, which corresponds to the chance number of identifications in each column. The departures from expectation will now appear as deviations from the mean. Instead, however, of calculating a mean deviation I have proceeded directly to a division of the total departures by the total values, i.e., nine times the mean, which gives in a form slightly different from the usual formula a coefficient of variation. It appears to the writer that the meaning of a mean deviation and a coefficient of variation derived in this manner would be confusing in reference to the present data, and I have preferred to develop the method and terms that are employed *de novo*, believing that they will have more direct logical significance for the reader.

well known Spearman formula the coefficient of correlation, $r = 0.84$. Herriot, Krassin and Agel occupy first, second or third position in both groups, though it was only in the case of Agel that the centering of agreement among the examiners took place upon the correct identification.

The appearance of each of these men as portrayed could be described for one reason or another as striking, in comparison with the others. In the case of each, it is safe to assert, one or more stereotypes, held in common among the judges, were evoked. With each stereotype, moreover, it seems likely that characteristic mental and moral qualities supposed in a similar stereotyped fashion to accompany it were suggested to the judges, and seen inferentially in the corresponding features.

In an effort to check this assumption, a further step in the experiment was taken by securing ratings of the sort obtained by Hollingworth. Students who had not hitherto acted as judges were used as subjects.[7] However, it is probable that interest in the previous experiments had already been aroused outside of the classroom among some of the subjects and that a number had an impression in consequence that there was a catch in the directions given. The same group of grange members as before was employed for comparison, all phases of the experiment being carried through upon a single occasion.

TABLE 3

*Total departures from expectation, indexes of departure from expectation and rank according to the indexes, in the case of identifications of nine portraits by students and by grange members*

| | STUDENTS | | | GRANGE MEMBERS | | |
|---|---|---|---|---|---|---|
| | Departures from chance | Indexes of departure | Rank | Departures from chance | Indexes of departure | Rank |
| Premier Herriot | 160 | 1.20 | 1 | 34 | 1.36 | 3 |
| Labor-Leader Duncan | 47 | 0.35 | 7 | 17 | 0.71 | 5–6–7 |
| Soviet Envoy Krassin | 119 | 0.84 | 3 | 37 | 1.42 | 2 |
| Deputy Comptroller McIntosh | 34 | 0.30 | 8 | 17 | 0.71 | 5–6–7 |
| Ex-Governor Glynn | 63 | 0.48 | 5 | 14½ | 0.63 | 8 |
| Bootlegger Agel | 140 | 1.02 | 2 | 39 | 1.50 | 1 |
| Manufacturer Schwab | 78 | 0.57 | 4 | 18½ | 0.80 | 4 |
| Manufacturer Heinz | 66 | 0.47 | 6 | 17 | 0.71 | 5–6–7 |
| Senator Pepper | 36 | 0.27 | 9 | 11 | 0.46 | 9 |

In the case of the students, three groups of judges were used. Each was requested to grade the nine portraits, first according to intelligence, second, according to craftiness. The latter was defined as that characteristic, the possession of which would lead to the taking of an unfair advantage in a business negotiation.

[7] This part of the experiment was not developed until the earlier part had been carried through. Moreover, reorganization of classes had intervened.

The first group of judges, 47 in number, were given no statement concerning the identity of the men portrayed. The second group, 31 in number, were misled by a set of false identifications, conforming so far as possible to the major erroneous identification in the earlier part of the experiment; that is, with an incorrect stereotype. These false identifications were as follows: Herriot as Bolshevik, Duncan as European Premier, Krassin as United States Senator, McIntosh as manufacturer, Glynn as financier, Agel as manufacturer, Schwab as editor-politician, Heinz as labor leader and Pepper as bootlegger. The third group, 39 in number, were shown the portraits accompanied by the real identities.

In the case of the grange members, the group was first asked to grade the nine portraits according to intelligence, without any identifications being given or suggested. After a lapse of time during which identifications were attempted by the members themselves they were asked to fold their papers in such a way that the first series of grades would be concealed. The correct list of identifications was then placed beside the portraits and they were asked once more to re-grade the portraits in intelligence without reference to their earlier gradings. The circumstances and the time allotted did not permit of gradings upon craftiness, or of gradings upon an erroneous set of identifications. Eighteen papers on which the grading and regrading were both carried through were received.

In aggregating the ratings in each case, an arbitrary system of weighting was employed, in accordance with which the picture rated highest was valued at 8 each time it was placed in this position. The second position in the rating was valued at 7, and so on down to the last or ninth posi-

TABLE 4

*Percentage ratings of nine portraits on intelligence by students and grange members, and on craftiness by students, under certain variable conditions concerning identification*

| | PERCENTAGE RATINGS ON INTELLIGENCE | | | | | PERCENTAGE RATINGS ON CRAFTINESS BY STUDENTS | | |
|---|---|---|---|---|---|---|---|---|
| | Students | | | Grange members | | | | |
| | No statement | False identity | True identity | No statement | True identity | No statement | False identity | True identity |
| Herriot | 40.7 | 54.0 | 62.2 | 30.5 | 73.0 | 63.5 | 50.7 | 49.4 |
| Duncan | 33.4 | 43.6 | 25.6 | 35.5 | 54.9 | 52.1 | 58.9 | 50.6 |
| Krassin | 69.8 | 78.3 | 69.2 | 79.0 | 34.0 | 30.3 | 29.4 | 30.4 |
| McIntosh | 53.0 | 45.6 | 61.9 | 52.8 | 54.9 | 54.0 | 56.0 | 57.4 |
| Glynn | 65.1 | 68.2 | 57.5 | 41.0 | 59.0 | 29.3 | 39.1 | 47.8 |
| Agel | 31.3 | 30.3 | 6.4 | 27.7 | 13.2 | 57.5 | 65.3 | 68.0 |
| Schwab | 60.2 | 52.0 | 70.9 | 69.5 | 72.2 | 46.3 | 39.1 | 41.4 |
| Heinz | 58.8 | 54.0 | 58.0 | 70.2 | 50.0 | 54.8 | 52.0 | 53.0 |
| Pepper | 36.7 | 28.8 | 39.2 | 45.1 | 51.2 | 61.7 | 61.4 | 51.0 |
| Mean deviation | 12.8 | 12.0 | 17.6 | 15.8 | 12.6 | 10.9 | 10.5 | 6.8 |

tion, which was valued at 0. The possible aggregate rating, therefore, ranged from 0 in the event that a certain picture was in each case rated ninth in the series, to a figure amounting to the product of eight times the number of ratings given—a figure possible of attainment only in the event that a given picture was in each case rated first in the series. The aggregate rating actually received by this method, when related to the maximum possible rating as a percentage of the latter, affords a basis of comparing the valuation placed upon the various portraits under the various circumstances indicated.

The changes in percentage ratings on intelligence when the true identities were disclosed, as compared with those made without statement or suggestion concerning identity, are as follows:

| | STUDENTS | GRANGE MEMBERS |
|---|---|---|
| Herriot | +21.5 | +42.5 |
| Duncan | −7.8 | +19.4 |
| Krassin | −0.6 | −45.0 |
| McIntosh | +8.9 | +2.1 |
| Glynn | −7.6 | +18.0 |
| Agel | −24.9 | −14.5 |
| Schwab | +10.7 | +2.7 |
| Heinz | −0.8 | −20.2 |
| Pepper | +2.5 | +6.1 |

In table 4 these percentage ratings only are presented, both for the students and for the grange members in the case of intelligence, and for the students alone in the case of craftiness. It should be noted particularly that *three groups of individuals* are referred to in the case of student rating, while the grange ratings are made in both cases by the *same* individuals. However, the variable conditions indicated by the column headings "No statement" and "true identity" are as near as possible alike in both cases.

Table 4 and the changes in rating under variable conditions indicated therein seem to indicate that ratings on intelligence and craftiness from photographs are influenced by the assumed or known identity or social type of the individual portrayed, that is, by the stereotype of such a person in the mind of the judge. Disclosure of the true identities of the nine men portrayed led to changes of rating in the same directions among both students and grange members, except in the case of Duncan, labor leader, and Glynn ex-Governor. It seems clear that among these nine individuals those whose positions or names in the business or professional world carry prestige, particularly McIntosh, Schwab and Pepper, tend to improve their ratings in intelligence and (except in the case of McIntosh) to decrease them in craftiness as their identities become known. The loss of Heinz in intelligence rating is only an apparent exception to this, for the mistaken identifications in this case were very largely for positions in the series which carry prestige. That is, no added impression of high social position was given by a disclosure of his identity. On the other hand, the declines in intelligence rating for the bootlegger and the bolshevik are striking, the former most noticeably among the students and the latter among the grange members.

Comparisons running counter to

*a priori* anticipation include that for Krassin, who among the students rates but slightly higher in craftiness when known as a bolshevik than when falsely represented to be a United States Senator. Nor do the data always appear consistent, as when the students rate Duncan higher in craftiness when alleged to be the Premier, while Herriot rates lower in the same characteristic when actually identified as the real holder of this position. But other variable factors of explanation may enter here; moreover it must be remembered that the numbers of judges are small.

Some of the more general conclusions suggested by the preceding data may be summarized:

1. The existence of common stereotypes concerning the appearance of various classes of persons (senators, bootleggers, etc.) is clearly indicated. These led to numerous errors of judgment.

2. The stereotypes found among students and grange members were similar, but there appeared to be a somewhat greater uniformity (concentration of judgment on the basis of a stereotype) among the latter.

3. Estimates of intelligence and craftiness, presumably based upon the features portrayed, are in reality influenced by the supposed identity of the portrait, i.e., by the stereotype of the supposed occupational or social status held in the mind of the examiner.

The implications suggested are both theoretical and practical. The data serve to emphasize the inescapable bias of preconception to which everyone is subject. Stereotypes afford a necessary economy of effort in the process of cataloging our environment. We take note of an actual or alleged association, which may be wholly fortuitous, among the attributes of an individual. From this we generalize and assume a constancy of the association. The appearance of another individual presenting a few of the attributes so associated leads us to believe that we recognize in him the other attributes as well.

The process of filling out our actual sense perceptions in this manner takes place in our face-to-face estimates of other people, no less than in the case of estimates made indirectly from photographs. The distorting effect even upon work which is presumed to be scientific may be given a further illuminating illustration: In his study of the criminal, which followed Lombroso in assuming the existence of an anthropological criminal type, Havelock Ellis presented a series of sketches of criminals made from life by Dr. Vans Clarke, a prison governor. They were alleged to be "by no means very exceptional," representing "at least 10 per cent of the criminals examined."[8]

The widely known Goring report reduced these sketches to a composite portrait, which evidenced features of a highly abnormal appearance.[9] Beside this it placed a composite portrait made from an equal number of photo-

[8] Ellis, Havelock: *The Criminal.* 5th edition. London, The Walter Scott Publishing Co., undated, Plates IV–IX. The preface to the 4th edition bears the date 1910.

[9] Goring, Charles: *The English Convict: A Statistical Study.* London, Published by His Majesty's Stationary Office (for sale by T. Fisher Unwin) 1913, Frontispiece and p. 1.

graphs selected at random from the official stock of photographs of a prison population. The features in the second case show no appearance of abnormality. The report comments: "An examination of these contrasted outlines shows most strikingly the difference between 'criminal types,' as registered by the mechanical precision of a camera, and as viewed by the imagination of an enthusiastic, but uncritical, observer." In other words Dr. Clarke's sketches were biased in a constant direction—the direction of his stereotype of the men before him.

Similarly one is made skeptical of attempts to derive scientific generalizations from biographical data concerning historical personages. One enthusiastic writer has referred to biography as "the one ripe and ready field for the study of physiognomy." "A tabulation of the faces and figures of eminent personages should long ago have suggested itself as desirable, if not indispensable."[10]

[10] Kassel, Charles: *Physiognomy and Genius*. Popular Science Monthly, 1911, Vol. 78, pp. 158–163. Also *Genius and Hair Color*. Popular Science Monthly, 1912, Vol. 81, pp. 284–290.

It is to be supposed that even contemporary biographers are fully as subject to stereotypes concerning their heroes as was Dr. Clarke with reference to the prisoners under his charge.

When individuals are in face-to-face contact there is usually an opportunity for the more erroneous stereotypes possessed by either concerning the other to be corrected in the process of becoming acquainted. First impressions are modified by conversation and other expressions of personality. When personality is judged by photographs, or by first uncorrected impressions of appearance, on the other hand, it is inevitable that striking errors will be made. It seems evident that a method of arriving at judgments concerning the character of fellow men or women, sufficiently realistic to serve as a basis for an employment policy, for example, cannot lean heavily upon photographs. The discovery and complete elimination of stereotypes is not wholly possible, but its approximation can probably be attained only as the result of face-to-face inter-stimulation and response.

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# New Type Examinations in the College of Physicians and Surgeons

By Ben D. Wood, *Columbia College*

(*Continued from the October issue*)

*This is the second and concluding article by Dr. Wood on the use of new type examinations in a medical college. In the preceding article, Dr. Wood discussed tests in the fields of pharmacology and anatomy. The present article is devoted to a test in orthopaedic surgery, a consideration of the relative difficulty of true-false questions, and a summary of the reasons for the superiority of the new-type examinations.*

### III. ORTHOPAEDIC SURGERY

LATE in the spring of 1925, Dr. Von Lockum, Associate in the Department of Orthopaedic Surgery, prepared, without technical assistance from any measurement expert, a final examination consisting of 13 multiple choice, 61 true-false, and 50 completion questions. This undertaking, of which the writer was first informed after the test had been taken by the 98 students constituting the third-year class, is symptomatic of the general desire of teachers in the College of Physicians and Surgeons to escape from the inadequacies of the old type examinations.

The Orthopaedic Surgery course is a comparatively brief course. Oral quizzes were given throughout the course; but the marks of these quizzes were not available as a criterion in this study for several reasons.

The Department was convinced of the validity of the objective type of examination from the beginning of the year, and planned to base the year marks almost entirely on the final examination. The only check on the final examination results was in the form of supplementary oral examinations of students who failed on the final or who otherwise seemed to merit review. The oral quizzes, therefore, became almost exclusively pedagogical devices, both teacher and student enjoying unusual and very effective freedom from the restraints of measurement considerations in the classroom, and from the "forced" atmosphere prevalent in classrooms in which "grading" is often and obviously practiced.

In the absence of any systematic grades in Orthopaedic Surgery against which to test the validity of the new type final examination, the writer

prevailed on Dr. Von Lockum to estimate the relative standing of the 98 men in the class on the basis of his personal observation of their work in the course. These subjective estimates were used as the orthopaedic surgery criterion. The college criterion was formed as in the study of the new type examination in Anatomy; but in this case the marks of three full years of medical college work were averaged.

The correlation between the new type final and the orthopaedic criterion was found to be 0.50. The correlation of the three-year college criterion with the new type final examination is 0.611 and with the orthopaedic criterion 0.392.

The reliability of the objective final examination is about 0.70. No means are available for estimating the reliability of the orthopaedic criterion; but its validity as a measure of specific achievement is indicated by the correlation of 0.50 with the new type final, and as a measure of general medical school ability by the fact that it correlates as well with the college criterion as one half-year average mark correlates with another half-year average mark.

The intercorrelations of the six half-year averages of these 98 third-year students range from 0.216 to 0.557 with the average at 0.382. The correlations of the first year average grade with second and third year average marks are 0.617 and 0.56, respectively; and of the second with the third year average mark, 0.55. Thus the average intercorrelations between whole year average grades is only 0.576.

*Relative difficulties of individual true-false questions*

A study has been made of the number of correct responses given to each True-False question in the Anatomy and Orthopaedic final examinations. In both examinations the questions are well distributed as to difficulty, especially those in Anatomy. (Since the number of students concerned is 100 in Anatomy and 98 in Orthopaedics, the numbers of correct responses may be thought of as percentages.) In the Anatomy examination there is one question, and only one, answered correctly by every student in the class; there is no question in this examination, however, which received less than 21 correct answers, and only 3 received as few as 21, and two of these were a little ambiguous. Thus the most difficult of the 130 True-False questions in the Anatomy examination was answered correctly by about 20 per cent of the students and the easiest by 100 per cent. About 10 per cent of the questions were correctly answered by more than 90 per cent of the students, and about 50 per cent of the questions were correctly answered by less than 50 per cent of the students. Since it may be of interest to know just what items of Anatomy knowledge are best and least known by students at the end of the Freshman medical year, we reproduce here the five hardest and the five easiest True-False questions. (The number preceding each question is the number which the question had in the test, and the number in parentheses after each question is the number of students that answered it correctly.)

*The five most difficult true-false questions in anatomy:*

40. The pulsation of the posterior tibial artery can be felt in the foot (21)[1]
18. The ulnar nerve supplies sensor fibres to two and one-half digits. (21)[1]
15. The origin of the brachialis muscle is embraced by two slips from the deltoid muscle. (21)
78. The lower extremity of the ligamentum pulmonis is reflected on to the diaphragm. (35)
13. The brachial artery lies upon the following muscles in order: long head of triceps, medial head of triceps, coraco brachialis and brachialis. (36)

*The five easiest true-false questions in the anatomy examination:*

25. In pronation the radius lies diagonally across the ulna. (98)
77. There is an eparterial bronchus in the right lung only. (97)
29. The chief function of the pelvic girdle is weight bearing, while that of the shoulder-girdle is to allow free mobility of the upper extremity. (96)
42. The adductor brevis muscle arises from the pectinal line of pubis. (96)
54. The anterior tibial artery accompanies the deep peroneal nerve in the leg. (94)

The examination in orthopaedic surgery contains only 61 true-false questions. One question, and only one, No. 11, was answered correctly by every student; the most difficult was answered correctly by 30 of the 98 students. One-third of the 61 questions were correctly answered by more than 90 per cent of the students, and only 4 questions were correctly answered by less than 50 per cent of the students. The five hardest and the five easiest orthopaedic true-false items are as follows:

*The five most difficult in orthopaedic surgery:*

53. The shoulder joint may be approached for drainage through the deltoid. (30)
50. Muscle spasm is a prominent symptom in fracture of the spine. (41)
21. In a fracture through the surgical neck of the humerus the upper fragment assumes a position of internal rotation. (43)
52. Acute suppurative arthritis of the knee joint is more frequent than that of any other joint. (47)
54. The elbow is best drained through its lateral aspect. (53)

*The five easiest in orthopaedic surgery:*

11. Tuberculosis of the hip is characterized by its usual acute onset. (98)
2. The most important single agent in the treatment of infantile paralysis during the early stage is rest in a position of relaxation for the paralyzed muscles. (97)
37. Nelaton's line extends from the anterior superior to the posterior superior spine of the ilium. (96)
31. Acute suppurative arthritis is best treated conservatively by immobilization. (96)
16. Pain is more severe in malignant disease than in tuberculosis of the spine. (96)

The orders[2] of difficulty of all the

[1] These two questions owe most of their difficulty to ambiguities. In No. 40 the good student is confused by the issue of the line separating leg and foot. No. 18 is usually false but sometimes may be true. The two questions are among the worst seven in the examination, as shown below.

[2] Space limitations do not permit us to reproduce the whole of any of the examinations here discussed. The orders of difficulty and of "goodness" of questions are presented in full for the benefit of medical college officers who have secured, or may secure, copies of the tests, and who may wish to make up and try out objective tests in their own classes. Such officers, and

true-false questions in each of these two examinations, from easiest to hardest, are as follows:

Anatomy:—25, 77, 29, 42, 54, 76, 1, 6, 9, 48, 5, 34, 8, 12, 27, 52, 61, 79, 19, 41, 75, 81, 84, 2, 49, 86, 22, 55, 68, 17, 4, 11, 46, 26, 44, 66, 71, 32, 73, 82, 3, 62, 87, 21, 28, 37, 39, 58, 69, 45, 38, 65, 67, 72, 7, 30, 35, 47, 50, 14, 23, 70, 80, 56, 53, 85, 63, 74, 31, 51, 83, 10, 64, 16, 20, 59, 24, 57, 33, 60, 43, 13, 78, 15, 18, 40; Part II A—5, 1, 6, 19, 16, 39, 3, 23, 24, 31, 11, 30, 36, 41, 15, 2, 7, 43, 40, 21, 38, 12, 17, 18, 33, 8, 26, 37, 22, 35, 14, 32, 28, 42, 9, 10, 25, 27, 13, 29, 34, 20. Orthopaedic surgery: —11, 2, 37, 31, 16, 6, 18, 49, 39, 36, 23, 19, 1, 59, 47, 45, 12, 17, 14, 10, 56, 27, 5, 51, 38, 29, 26, 15, 28, 61, 41, 13, 3, 60, 35, 25, 34, 24, 20, 33, 57, 55, 43, 7, 22, 4, 30, 8, 9, 48, 42, 46, 40, 44, 58, 32, 54, 52, 21, 50, 53.

*The "goodness" of individual true-false questions.* It is a common experience of teachers to learn after giving an examination of the old type that some of the questions are not "good," that is, they give negative or zero correlation with the criterion, or in other words, give higher scores to the poor men than they give to the good men. The primary purpose of an examination is to separate the sheep from the goats; if a question in an examination rates the good men as no better, or worse, than the poor men, that question is not good. Its effect is not to help separate the good from the poor students, but to pull the good down and push the poor men up above their true relative positions. It is the presence of such questions that, among other factors, causes a test to be unreliable and invalid.

At first thought it seems impossible that a question could be fashioned which would give higher ratings to poor students than to good students. But such questions not only occur, but occur frequently. It would be very profitable if we could isolate the causes which make questions behave in this curious manner. Studies have been made of such "rogue" questions in certain subject-matters, with the general result that subtle ambiguities in the statement of the questions are mainly responsible—ambiguities which stupid students do not see, but which bright students catch and by which they are caught. In order to be of practical guidance, such studies have to be made in each subject-matter, because rules do not seem to carry over from one subject-matter to another. We have determined the "good" and "bad" true-false questions in the anatomy and orthopaedic surgery examinations in the hope that the traits of each kind will be studied so that we may know how to make good questions, and avoid bad ones in future medical examinations.

The students in anatomy were divided into three groups according to final year grades in anatomy. The low group numbered 33, the middle group 34, and the high group 33 students. The numbers of students in these groups answering correctly question No. 67 in Part I were 16, 26, and 30, respectively; that is, less than half of the low group answered it correctly,

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other accredited teachers, may secure copies by addressing the Dean of the Colleg of Physicians and Surgeons, Columbia University, New York City. These studies of individual questions are presented merely as a suggestion which might bring about a more adequate appreciation of both the difficulty and the importance of making good questions with ample range of difficulty.

and more than 90 per cent of the good group answered it correctly. This is probably the best true-false question in the anatomy examination. There are four other questions nearly as good as this one—Nos. 10, 35, 43, 63.

The worst true-false question in the anatomy examination is No. 13—a curious confirmation of a popular superstition. Thirty-six per cent of the low group, 48 per cent of the middle group and 24 per cent of the high group answered it correctly. Whatever ambiguity this question contains is detected by the brightest students only. It is a good question for differentiating the very poor from the average; but it works havoc on the brightest third of the class, dragging them down even below the low third. Question No. 40 is almost as bad as unlucky No. 13. It pulls both the two upper thirds of the class equally far below the low third.

The order of "goodness" of all the true-false questions in the anatomy examination is as follows, beginning with the poorest:

Nos. 13, 40, 26, 45, 30, 15, 18, 23, 25, 16, 20, 29, 44, 59, 76, 77, 84, 1, 6, 19, 31, 33, 42, 48, 51, 3, 27, 39, 66, 4, 12, 49, 61, 68, 81, 87, 22, 46, 51, 54, 73, 79, 2, 5, 21, 34, 41, 55, 57, 9, 11, 32, 53, 58, 74, 75, 78, 86, 8, 14, 17, 28, 37, 85, 56, 64, 69, 70, 80, 24, 50, 82, 38, 47, 60, 62, 65, 72, 7, 83, 71, 10, 35, 43, 63, 80, 67. Part II A: Nos. 3, 20, 31, 1, 5, 7, 9, 11, 13, 16, 19, 40, 6, 12, 33, 35, 8, 14, 21, 24, 26, 36, 38, 10, 17, 18, 23, 25, 30, 43, 4, 27, 39, 2, 34, 41, 15, 22, 28, 37, 29, 42, 32.

The order of "goodness" of the orthopaedic true-false questions is as follows, from poorest to best:

Nos. 46, 10, 38, 44, 58, 1, 11, 37, 53, 2, 3, 18, 59, 6, 16, 27, 28, 31, 36, 47, 49, 54, 61, 14, 19, 39, 60, 12, 17, 21, 22, 23, 35, 50, 56, 57, 5, 8, 25, 26, 29, 32, 34, 41, 45, 4, 15, 51, 13, 24, 40, 7, 20, 42, 43, 9, 33, 55, 48, 52, 30.

### *Reasons for superiority of new type examinations*

Those who are accustomed to use the old type of examination exclusively may find it difficult to reconcile the findings of this study with "common sense" views of examinations. Most of this difficulty will be due to an exaggeration of the virtues of the old type and to a failure to appreciate the exact nature of new type questions; it is also partly accounted for by an exaggeration of the differences between memory and reasoning ability. These two mental functions are in reality very close correlates. Many teachers have needlessly plagued themselves with a mighty fear of students' "getting away with something" by freakishly memorizing everything without "reasoning out" anything. It is a great pity that these marvelous memory freaks are so rare as to be almost mythical. All the scientific evidence available tends to show that "memory" and "reasoning ability," as far as examinations are concerned, are little more than different names for the same thing—a good measure of one is nearly always a good measure of the other. We cannot remember effectively without thinking and we certainly cannot think or reason without remembering something to think with.

The old type examination as usually administered and scored is much more a mere reproduction or memory test than a well constructed new type test. When a student is asked to describe a

joint, or the action of a drug, he can do little more than set down in hasty sentences the facts that he has learned through reading about and observing the joint and the drug in question. It is difficult to see how any significant reasoning is possible in the answering of such a question.

The fact of the matter seems to be that the main value of the old type examination is that it *is* a measure of ability to reproduce what has been read or observed; and its main weakness is not so much that it does not measure "reasoning ability" but that it is a very unreliable and inadequate measure of "memory." It is not a good measure of either of these functions because among other reasons, (1) it is *subjective* to both student and teacher; (2) it can involve only a *narrow sampling* of subject matter and of performances; (3) it involves the exercise of a very special talent, prose writing, under very adverse conditions; and because, (4) it not only permits but provokes bluffing and playing to personal prejudices on the part of both student and teacher.

The new type test is a better measure of both reasoning and information because it is objective, it provides very wide samplings of materials and performances, it involves few irrelevant and distracting activities, and because it may include problems of fact, of cause, of effect, of relations and of judgment which make as great and as genuine demands on the higher intellectual processes as those which are found in old type tests.

## CONCLUSIONS

1. Objective forms of questions seem to be as well adapted to the measurement of achievement in medical courses as in the average college course.[3]

2. Each of the nine forms of questions tried out in this experiment have considerable validity for medical school courses. The most effective seem to be the standard forms—true-false, completion, and multiple-choice;—but with more adequate trials, the tabular forms of questions may prove to be as good as, or better than, the standard forms, particularly for certain aspects of medical work.

3. The reliability and validity coefficients of the objective examinations described in this report are two or three times as high as those of much longer examinations of the old type in the same subject-matters.

4. The objective examinations measure "reasoning ability," as defined by the criteria now used in the College of Physicians and Surgeons, more accurately and more reliably than old type examinations of equal or greater length measure it.

5. The reliability and validity of Medical College grades based on the old type examinations have been found to be entirely inadequate. Our results confirm the findings of other investigators.[4] The first year of Medical School work predicts second year work

[3] See Wood: Measurement in Higher Education, World Book Co., 1923: also Measurement of Law School Work I and II, Columbia Law Review, March 1924 and March 1925.

[4] Notably of Professor E. A. Bott: "The Predictive Value of College Marks in Medical Subjects." Journal of Educational Research, September, 1925. See also Moss, F. A., and Hunter, O. B., Public Personnel Studies, Washington, D. C., February 1925. page 52.

no better than High School average marks predict college success.

6. The adaptability of objective forms of tests to Medical School work demonstrated by this experiment, suggests the hope that eventually there may be derived a series of objective, reliable, and administratively convenient examinations on the common essentials of the Medical curriculum, which will be universally applicable and which will afford *accurate* measures of *defined* achievements expressed in *comparable* and universally meaningful units. Such measures are prerequisite to the constructive educational guidance of students and to certain types of long-needed research in medical education. As in all other educational institutions, the first duty of the Medical College, is not to *teach* but to *learn* students—to learn whether they belong in Medical College, and if so, what specialties they might best pursue, if any. That this first duty has not been satisfactorily discharged by higher institutions generally is indicated by the high and increasing academic mortality rates in our Colleges of Liberal Arts, of Engineering, of Law, etc. The traditional examinations have not merited the confidence which we have reposed in them. The objective forms of tests will by no means furnish panaceas for all the maladjustments in our educational system; but that they are capable of giving us more exact and more meaningful information about our students than the traditional examinations has been demonstrated beyond reasonable doubt.

(*Manuscript received June 20, 1926*)

# Book Reviews

## EDUCATIONAL AND VOCATIONAL GUIDANCE

*By William Martin Proctor. Boston and New York: Houghton Mifflin Company, 1925. Pp. ix + 352*

REVIEWED BY C. S. YOAKUM

The subtitle of this volume is "A consideration of guidance as it relates to all of the essential activities of life." Both editor and author are of the opinion that mere vocational guidance is not the entire story. The first feeling of satisfaction that comes to the personnel man rests in the discovery that among those new members of the firm lured by him are some who fit into the situation wonderfully well. His self-satisfaction increases as he finds few misfits among them. It is something of a shock to discover that one of his best finds is also an excellent tennis player, or an energetic worker in church circles, or an amateur poet. Only by slow stages does he realize that this man has become a friend of his. We all need to be returned from time to time to other points of view. Procter has given each specialist—and particularly the personnel man—opportunity to return and to consider other things about men than their vocational fitness.

The book has this general value in great measure. A large amount of material has been condensed into small compass and made available by specific chapter, paragraph, and topical headings. The table of contents is particularly clear in pointing out both the author's conception of "essential activities" and in indicating where discussion may be found. Articles and discussions and experiments almost inaccessible to the busy executive are summarized. The literature that attempts quantitative investigation has been emphasized throughout. Perhaps the effort to cover the field of the developing individual gives the book a superficial aspect. An examination of books limited to a single view suggests that whatever superficiality may be present, is there because so little is really known about the relation between older and younger persons, which constitutes the conditions for all guidance.

Among the volume's special value to personnel workers generally is the fairly extensive survey of the literature already mentioned. To the business world, the volume offers an unusually compact picture of those who will come into business in a few years—the entire pre-working group up to the high school period with glimpses beyond. Another element of interest and value is the simple and clear statement of many techniques used in different investigations. In this respect it is full of information to those who are not specializing in research yet desire to keep as fully informed as possible regarding new methods and results. Repeated illustrations of the dangers of hasty generalization are given. Of interest to educational directors are the methods used in planning curricula and in arranging them to give emphasis to the various guidance activities.

A list of the chapter headings would be fully informative of the contents. Guidance is investigated in relation to intelligence, special abilities, selection of courses, social and physical activities, use of leisure time, learning about the world. Perhaps the term guidance is not the best for such a test, nor must we expect to much from the eclectic view; but it is important to have such volumes with up-to-date revisions of them at regular intervals.

## FAMILY WELFARE WORK IN A METROPOLITAN COMMUNITY

*By Sophonisba P. Breckinridge. Chicago: University of Chicago Press, 1924. Pp. 938*

REVIEWED BY ARTHUR EVANS WOOD

This volume by Professor Breckinridge was prepared in response to a growing demand among teachers of case work for available teaching material. It consists of forty-four case records selected from a much larger number already in use in the Graduate School of Social Service Administration of the University of Chicago. The records are taken from the files of the two major agencies engaged in case work in Chicago, namely, the United Charities and the Jewish Social Service Bureau. The case records themselves cover over eight hundred pages and an additional hundred pages include certain important statutes affecting Poor Law administration and annual reports of some of the public welfare agencies of Chicago and of the State of Illinois. Surely, no one can deny the assiduity and courage of an author who thus launches nearly a thousand pages of closely printed case material upon an already swollen tide of social service publications.

The cases themselves cover the following types of emergency: sickness, mental disease, "non-residence," illegitimacy, industrial accidents, dependent childhood and old age. These problems are prevalent among all social classes, but they are complicated by a poverty situation which is the immediate occasion for their coming to the attention of the social agencies of a great city. Unfortunately, there are few such agencies available for those whose problems of adjustment are not aggravated by severe economic pressure, however great their needs may otherwise be. With them the American tradition still holds, that every mother's son must work out his own salvation without the concern of the community. How poorly it goes with these upper class folk is too often revealed in the records of our divorce courts. Case work in some respects is a new technique for the old-fashioned "pastoral care" which has all but disappeared from the practice of the church.

It is, indeed, a far cry from the time when the public relieving officer made a record of "April 3, 1879—Groceries for the Jones family" to the elaborate narrative of situations, interviews and services that run from ten to thirty pages in each of the case of the volume under discussion. One is made aware that in our better family agencies the investigation of maladjustment has become a matter of highly refined technique, comparable only to the equally elaborate endeavor to render constructive services, aimed not only at meeting an emergency but also at effecting a more or less permanent adjustment on a new and higher plane. One sees by these records how the efficiency of case work is limited by the wisdom and skill of the social workers, and even more by conditions within the community, including its lack of equipment for giving constructive help to families in distress. A great modern city is bewildering enough to those of us who by good luck or the grace of God do not become "social problems;" but to the poor and ignorant it is often a veritable wilderness in which they flounder to the brink of degradation, and too often over into the abyss. Case workers are engaged in clearing away the underbrush and straightening out the paths to self-respect and competency. It is they, also, who are bringing pressure to bear upon the agencies of law, medicine, and education, and even upon industry, in order to socialize them, that they may come to render their proper contribution to the elevation of life within the community. Case work, therefore, leads directly to "human engineering," and to the reorganization and rebuilding of our cities in the interests of welfare.

Of special interest to personnel men should be the four cases dealing with industrial accidents and disease. The re-

sponsibility of industry for these misfortunes is clear. Large industrial concerns have shown a commendable interest in the prevention of accidents, though they have yet to assume an adequate responsibility for the occupational and social adjustment of injured men and their families. To be sure, legal compensation has now been established in most states, yet the awards are usually so meagre as to require assistance to these families from other sources in the community. How it fares with some of them, pending the delays, the sometimes conflicting diagnoses, and the disputes among the lawyers, is amply brought out in the records. However, the inadequate awards under compensation laws are preferable to the hazards of court action with the legal advantages on the side of the employer. The last of these industrial cases is one of occupational disease which as yet does not fall within the compensation law of Illinois. The case is one of lead poisoning which causes blindness in one eye. After a great deal of manoeuvering the agency finally succeeded in getting the man established in a small business; but to do so consumed two years of ceaseless and devoted work. As far as his former employer was concerned the man had been abandoned as so much junk.

The lesson of these industrial cases for personnel workers would seem to be that industry owes a distinct obligation to the community for taking care of its human scrap. Efficiency in the management of men on the job in no wise compensates for the neglect on the part of employers of their larger obligations. These might be met in the larger plants by the employment of a full-time case worker, or through contributions to an independent case work agency.

For teaching purposes the volume is somewhat lacking in that the records are printed in a barren way, without analysis on the part of the editor, or any helps to students in the form of questions, marginal notes, or topical divisions of the case material within each record. The result is a bulky, unattractive volume which few but advanced specialists would be drawn to were it not for the hope of a college grade!

# Abstracts

*Progress in Accident Prevention.* LEWIS A DE BLOIS. Monthly Labor Review, March, 1926, Vol. 22, No. 3, pp. 539–541.

I. Accidents prevented by

a. Protection or guarding which is quick, simple, and cheap but whose success depends upon safety education.

b. Education so that the hazard may be recognized and avoided.

c. Elimination or reduction of the hazard.

II. Safety education

a. Rests upon the inculcation of a new point of view on accidents and value of human life.

b. Teaches individual that industrial accidents are caused and do not happen and that causes are preventable.

c. Tells that prevention of accidents is result of coöperation.

d. Awakens mind to loss in money and loss in suffering due to accidents.

e. Must break down old concepts, mental attitudes, and habits of thought and action that are of racial origin.

f. Must change viewpoint with regard to accident prevention.

Causes of difficulty in changing present viewpoint.

A. 90 per cent of our population is white, 77 per cent of it is native, 55 per cent of it is of native parentage.

B. In 12 months ending June 30, 1924 we admitted 707,000 alien immigrants, of whom 10,000 were absolutely illiterate.

C. 0.5 per cent of our 196,000 manufacturing establishments are large enough to employ over 1,000 employees, 92 per cent employ less than 101, but in these scattered factories there are 2,500,000 workers to be reached.

D. Industry is becoming mechanical and with mass production the hazards are becoming greater.

E. We are in a wave of industrial prosperity and are constantly taking on new employees. Chance for injury to a new employee is two to five times as great as for employees of longer service.

F. Prosperity engenders carelessness; as employment curve declines, workers are more amenable to education.

*The Injured Worker's Viewpoint.* HERBERT W. MOSES. National Safety News, July 1926, Vol. 14, No. 1, pp. 17–18.

The worker's viewpoint arises out of "The Four F's." Finance means poor financial condition and consequent worry. Family Fracas produces a disturbed frame of mind which often lasts through the day's work. Foolishness embraces carelessness and recklessness. Fever means sickness as a contributory cause of inefficiency and accidents. Author believes that it is important to interview workers as soon as possible after accidents occur. Tabulation of causes should not be left to an office clerk. Article reports a study of 70 lost time cases in Edison Electric Illuminating Company of Boston. Sixteen questions are asked, the answers to eight of which are tabulated as follows:

*Why the accident happened*

| | |
|---|---|
| 1. Did you understand the work you were doing at the time of your injury? | |
| Yes | 68 |
| No | 2 |
| 2. Was this a part of your regular work? | |
| Yes | 68 |
| No | 2 |
| 3. Have you ever received instructions how to perform this kind of work? | |
| Yes | 56 |
| No | 8 |
| Hired as experienced workers and thought no instructions necessary | 6 |

4. Were any precautionary instructions given you prior to starting the particular piece of work which caused your injury?
   - Yes..... 60
   - No..... 10
5. How long have you been engaged in this particular kind of work?
   - Less than 6 months..... 14
   - Between 6 months and 1 year. 8
   - Between 1 and 5 years..... 22
   - Between 5 and 10 years..... 16
   - Between 10 and 33 years..... 10
6. Have you ever had a similar accident?
   - No..... 65
   - Yes..... 5
7. What do you consider the cause of your accident?
   - Carelessness..... 14
   - Unavoidable..... 13
   - Poor housekeeping..... 10
   - Poor tools..... 7
   - Wrong method of working..... 6
   - Working beyond strength..... 6
   - Don't know..... 4
   - Improper clothing..... 3
   - Improper instructions..... 2
   - Poor construction..... 2
   - Illuminating gas..... 2
   - Poor light..... 1
8. What do you recommend to prevent such accidents?
   - Be more careful and think more. 32
   - No suggestions—freely admit their own fault..... 22
   - Constructive suggestions of a diversified nature, practically all of which have been adopted by the company.... 16

Evidence points to satisfactory training and supervision. This group of accidents is not dependent on experience. Author emphasizes importance of ill health. Criticizes term "light work" as it is difficult to arrange for. Believes that there is more than a casual relation between sickness and accidents. Gives no data for this statement.

*Underweight Reduced Among Adult Employees in Industry.* Marion County Tubercular Society. The Nation's Health, January, 1926.

Gives the procedure and results of an experiment in rebuilding the health of employees in the Eli Lilly Company, a national manufacturer of pharmaceutical supplies, conducted by the Marion County Tubercular Society, Indianapolis, Indiana. Procedure followed a system of Dr. Emerson, child nutrition expert of Boston. Group of twenty-one women who were underweight were put through a health building program of thirteen weeks. Program included change in living schedule, physical examination, daily rest periods, lengthening of sleep period at night, instruction in health habits and the establishment of milk lunch stations.

Sixteen of the twenty-one girls had from one to three abnormal conditions. All members in the group showed gains of from two to sixteen pounds in weight. The average gain of the group was 4.15 pounds.

*An Unusual Safety Record and A Unique Celebration.* ELLIOTT MCGAUGHAN. National Safety News, July, 1926, Vol. 14, No. 1, pp. 19-21.

On March 7, 1926, the Colonie Shops of the Delaware and Hudson Company completed 2 consecutive years without a reportable accident. A reportable accident according to the regulations of the Interstate Commerce Commission is "an accident that keeps its victim away from work for a period of more than 3 days out of the first ten following an accident." The 475 members of the car department at Colonie worked 2,050,579 man hours to establish this record.

These shops are organized for safety with a plant committee of 18 members. They represent each department and serve for 6 months. What is called the "Daily Correction System" is established. No day must close without an unsafe practice corrected by each member of the committee. In 1924 4,451 unsafe practices and

conditions were reported as corrected. In 1925 7,420 were handled.

*Types of Medical Service in Industrial Plants.* H. D. BROWN. The Nation's Health, November 15, 1925, p. 738.

Philadelphia Health Council and Association of Industrial Medicine completed survey in Philadelphia to determine (*a*) how many plants in Philadelphia have medical service and (*b*) general extent and character of such service where it exists. One-half of firms surveyed worked in metal machinery, or textiles; others miscellaneous. Medical services vary: "complete service consists of one or two of these features; "emergency" service consists of physician on call or services of first aid attendants.

*Extent of medical service in industries of Philadelphia in 1924*

| | PLANTS ACCORDING TO NUMBER OF EMPLOYEES | PLANTS ACCORDING TO TYPE OF SERVICE | | | |
|---|---|---|---|---|---|
| | | Complete | Incomplete | Emergency | None |
| Plants employing: | | | | | |
| Less than 75 | 400 | 0 | 10 | 148 | 242 |
| 75–149 | 162 | 0 | 3 | 89 | 70 |
| 150–299 | 118 | 4 | 17 | 63 | 34 |
| 300–499 | 83 | 8 | 11 | 30 | 34 |
| 500–999 | 70 | 9 | 15 | 33 | 13 |
| 1000 and over | 40 | 25 | 8 | 2 | 5 |
| Total plants | 873 | 46 | 64 | 365 | 398 |

Both accidents and illness treated in dispensary in 75 of 87 plants.

Both emergency and continued treatment in 51 of 87 plants.

Physical examination required (before employment) in 41 of 87 plants.

Physical examination required (after employment) in 35 of 87 plants.

Benefit associations in 42 of 87 plants.

Health education activities in 80 per cent of the plants.

*Cost of medical service*

| | PLANTS ACCORDING TO NUMBER OF EMPLOYEES | COST RANGE | AVERAGE PER CAPITA PER YEAR |
|---|---|---|---|
| Plants employing: | | | |
| Less than 500 | 11 | $4.40–$12.63 | $8.47 |
| 500–1000 | 9 | 2.00– 11.83 | 6.06 |
| 1000 and over | 4 | 2.11– 11.70 | 4.23 |

Recommends provision for adequate medical service to small groups of workers—units of 1000 to be formed, each employer providing first aid room for medical and surgical relief. The health council to provide physician and nurse. Each employer to pay his pro rata share, estimated at $4.50 per year per capita. After year's demonstration firms to take over operation of unit and health council to organize others.

*Physical Examinations in Industry.* F. L. RECTOR, M.D. Monthly Labor Review, April, 1926, Vol. 22, No. 4, pp. 18–23.

Purpose of physical examinations to fit the worker to his employment with the least danger to his physical or mental health. When practice was first started physical examinations were prostituted to unworthy motives by ignominious physicians who would reject any workers the management desired. Now the theory is that no one is to be denied employment for physical reasons unless he may become a danger to himself and others. On these grounds few are rejected. Records show that defective workers when given employment in something they can do, are better workers than others.

Physical examination records should be confidential between doctor and worker. These records serve as good basis for statistics. In modern practice the medical department has nothing to do with the discharging of men. Advantages industry

derives are healthier working force, greater freedom from injury and illness, reduced compensation expenses, less labor turnover and greater efficiency. The men derive the same advantages because of their increased value to the community. Men often did not realize anything was wrong with them until examined and by proper correction of the fault they are brought back to health and efficiency and avoid becoming a charge on the community. Of 442 plants 217 gave their men physical examinations and there were 1.66 injuries per worker per year while in 225 plants not using examinations there were 1.72 injuries per worker per year.

A physical examination takes from five to fifteen minutes and extra time for those cases where an uncertainty arises. Labor unions' and employees' opposition has been proven to be more fancied than real. There are two classes who object to examination: (*a*) Those workmen who are diseased or defective and hide it for fear of not getting work, (*b*) chronic kickers who wish to do nothing other than the daily routine of their lives.

*Suggested Tests for General Machinist.* OLIVER C. SHORT. Public Personnel Studies, July, 1926, Vol. 4, No. 7, pp. 211–223.

Gives duties, typical examples, minimal and additional desirable qualifications of general machinist. Outlines under six groups with proper weights for each of the fields covered by the tests. A short description of the meaning of each test is given. Then follows a complete set of the test suggested. A comprehensive sample from which could be built many special sets for machinists.

*A Sound Basis for Wages.* JOHN P. FREY. The American Federationist. January 1926, Vol. 33, No. 1, pp. 26–34.

Discusses a sound basis for wages. The law of supply and demand as expanded by Adam Smith became foundation stone of employers' resistance to wage demands. Employers refused to accede to employees' wage demands because of this law. The question of whether they were entitled to higher wages had nothing to do with the matter. Trade unionists demanded and secured higher wages as industry's power to produce increased. Old economic theories were proved fallacious by this fact. Workmen discovered that collective action enabled them to secure higher wages, regardless of employers' objections or laws. The trade unionists found themselves overwhelmed by the rapidly growing industrial system which was unconcerned with their welfare as individuals.

Trade unions developed principles or reasons to qualify their demands:

a. Fair day's pay for fair day's work.
b. Living wage
c. A saving wage
d. A full return for the value of the workers' contribution to society.

These wage statements fall to pieces when analyzed. Who is to determine a living wage, fair day's page, etc.? Modern industry is dynamic. Relations between employees and employers are changing. Wealth created by hand labor barely sufficient to keep mass of people alive.

The development of steam power and machinery increased production and national wealth. Population increased due to increase in wealth. Practically all powers of nature have been harnessed to develop natural resources. Production has been increased through intelligent management, elimination of unnecessary labor, mechanical assistance given to labor, and planning. Production increased beyond consumption needs. This development has created new cause of unemployment and wage problems. Transportation developed parallel to industrial development.

Generation ago manufacturing countries accumulated wealth (in hands of few) by selling goods to other countries or colonies. Modern industry has increased native production, with a tendency to destroy import and export trade except between countries lacking raw materials. Every country must become prepared to consume the bulk of its own products. Wages important in increasing home consumption of goods. Per capita production has increased 40 per cent, real wages 4 per cent from 1899 to 1925. Wage earners less able to buy back

what they produce than they were 25 years ago.

"Social inequality, industrial instability and injustice must increase unless the workers' real wage, the purchasing power of their wages, is increased in proportion to man's increasing powers of production." Not to be expected that the most scientifically sound basis for the determining of wage rates would immediately convince industry that its welfare demanded that wages should be increased so that the worker's power to produce would be balanced by his power to consume. Principle gives wage earner a basic factor upon which to determine amount he should receive.

*A 90 Per Cent Increase in Labor Efficiency.* T. A. SYLVESTER. Manufacturing Industries, April, 1926, Vol. 11, pp. 249–252.

Describes group bonus incentive in work of a wharf gang handling barrels, drums, and kegs. Study covers a period of two years, of a gang (chiefly negroes, intelligence slightly above average for that type of work), and four systems of pay.

For period of day rate the efficiency varied between 55 per cent and 60 per cent. In the second period (installation period) different and better methods of handling work were installed and efficiency jumped to 62–72 per cent. During third period (piece rate period) the efficiency did not reach 100 per cent as expected, due to natural causes, and ranged between 77 per cent and 87 per cent. With introduction of group bonus period efficiency jumped to 108 per cent. Four essential features were:

1. The bonus was computed from precisely the same standard rates of production as the piece and premium rates had been figured.

2. The bonus was paid as a flat per cent of each man's hourly or daily rate both for direct and indirect labor.

3. The bonus was computed upon a two weeks period.

4. Standard amounts of indirect labor (foreman, clerk, janitor, service, cooperating and inspecting) were allowed. Savings affected justified the bonus in these departments.

The plan did not receive approval of the workers for two reasons:

1. The thought that the bonus to be paid to the foreman and indirect workers must be coming out of the laborer's pay.

2. Difficult to figure each day's bonus and fear that bad breaks would cut down efficiency.

First objection explained away but second was adjusted by installing a daily efficiency plan and bonus. One per cent bonus allowed for each per cent of efficiency over 66 per cent to 95 per cent and one per cent additional bonus allowed for each per cent over 95 per cent to 125 per cent.

*Average hourly earnings for four periods*

| | CENTS PER HOUR | PER CENT BONUS |
|---|---|---|
| Day work | 48 | 0 |
| Installation period | 49 | 2 |
| Piece work | 53 | 10 |
| Group bonus | 58 | 21 |

Author's summary of incentives produced:

1. The opinion of his fellow workers stimulates each man to do his best.

2. It eliminates all jealousy of the piece worker's earnings from the indirect worker's mind.

3. It is highly stimulating to the most valuable man in the group, the foreman.

4. It eliminates the suspicion of favoritism in giving out the piece work.

5. It taps a great source of efficiency very deeply. It secures whole-hearted intelligence, interest, and enthusiasm from the entire working force.

*The Present State of the Art of Office Management.* W. H. LEFFINGWELL. Society of Industrial Engineers Bulletin, December 17, 1925, pp. 10–12.

Management is art of handling men, materials, and machinery for the purpose of producing certain desired results. Has as yet barely touched the office, although need is vital. A measuring stick is needed to ascertain effectiveness of work done in office. Average clerk of to-day is not equal

of average clerk of a few years ago in intelligence, training, and ability to perform work. Fault lies with management.

Made a study of conditions in offices by sending examiner to collect data. Facts collected then rated according to standard formula. Subjects and average ratings:

| | per cent |
|---|---|
| 1. Use of office machinery | 96.0 |
| 2. Intercommunication | 83.0 |
| 3. Equipment | 82.5 |
| 4. Forms | 80.7 |
| 5. Filing | 80.0 |
| 6. Correspondence | 79.3 |
| 7. Salary standards | 77.8 |
| 8. Control of output | 76.3 |
| 9. Routines and methods | 75.0 |
| 10. Organization | 70.9 |
| 11. Turnover | 67.5 |
| 12. Arrangement | 65.17 |
| 13. Stockkeeping | 63.2 |
| 14. Personnel | 53.8 |
| 15. Clerical output | 48.5 |

Appears that average office is not 50 per cent efficient. Modern management methods should easily save half this loss, a saving of approximately $3,000,000 a day.

*Employee Representation Plan of the Durham Hosiery Mills.* JOANNA F. STURDIVANT. Social Forces, March, 1926, Vol. 4, No. 3.

Describes the plan of employee representation used in the Durham Hosiery Mills. The information for the article was obtained from the officers, stockholders, and employees of the company, and from several periodicals. Mr. Julian S. Carr, Jr., president of the corporation, was the originator of the idea of putting on an organization in which the employee and employer would become a unit with mutual interests. In trying to formulate one definite ways to bring his desires to pass Mr. Carr became interested in John Leitch's book, *Man to Man*, and used several of Leitch's ideas in his plans. The plan was put to the vote of the workers and readily accepted. The constitution was drawn up by a committee of three foremen and three employees and adopted by the mills.

The constitution provided for a non-elective cabinet made up of the chief executives of the company, a non-elective senate made up of the department heads and subforemen, and a house of representatives elected every six months on the basis of one member to every 19 to 45 employees in the department. Five standing committees were formed: Justice, Coöperation, Economy, Energy, and Service Committees. Meetings were held twice a month on the mill's time, each employee being given a chance to express through his representative his views of the policy of the organization.

Bills originated in either house and were transmitted to the other. When a bill had passed both houses it was sent to the cabinet for approval, rejection or amendment.

The results of the plan were for a while very satisfactory. Many improvements were installed, wages were increased, and club rooms and play grounds were provided for the children.

The plan was broken up, however, when wages were cut during a depression and many of the employees left the plant.

The plan was worth while in that it kept capital and labor on an even footing during a time when many other industries were going through strikes, lockouts and other undesirable experiences.

# Labor Turnover: How Is Its Significance Best Presented to Supervisors?[1]

By Eugene J. Benge, *Mitten Management, Inc.*

*Mr. Benge has drawn from a rich background of personnel experience in preparing this concise paper. Attention is drawn particularly to his discussion of the ways by which foremen and executives may be made to feel responsibility for labor turnover.*

There are two methods in current use in keeping turnover records. One is the ledger or tally method, and the other the use of Hollerith or Powers cards, which allow for the tabulation of more detailed information.

Labor turnover reports should give at least the following information for each department or gang: Average number of employees on roll for the period, number of individuals employed, number transferred into the department, number transferred out, number left the company, and the percentage of labor turnover based on those whose names have disappeared from the company payrolls.

It is desirable to keep a running record of monthly labor turnover in chart form so that supervisors may readily compare present with past performance. These charts may show comparisons of labor turnover by plants, by departments, or by foremen.

Methods are given for putting across to foremen the facts which have been discovered concerning labor turnover.

Points are listed which may be used in making the foreman feel considerable responsibility for labor turnover.

Means by which foremen and higher executives can reduce labor turnover are given.

A GREAT deal of study is being given by scientists to the subject of labor unrest, of which labor turnover is in great part a concrete manifestation. Undoubtedly much of value will be contributed by psychologists and economists who are making studies of this kind. However, there is no question but that a great deal of so-called labor unrest is due to very specific and quite avoidable factors in individual companies. I refer to such banal items as inadequate washing facilities, unnecessarily dirty or offensive working conditions, inadequate provisions for transportation, poor tactics of foremen, bad management policies, and similar preventable causes.

In our search for the elusive "almost negligible" labor turnover which some concerns report they have obtained

[1] Read at a joint meeting of the Personnel Research Federation and the American Statistical Association, New York, October 8th, 1926.

we should not lose sight of the fact that a certain amount of labor turnover is desirable. None of us would wish to work in a purely static working force.

The labor turnover index has several interesting cousins which should not, however, be confused with it. One of these is the average length of service; another, the percentage of exits having over a specified length of service. The two latter are frequently used as labor indices, and justly so, but are functions of labor stability, not mobility. Concretely, the labor turnover index does not differentiate whether twelve men left one single job in a given period or whether twelve men left twelve different jobs; the two cousins will be affected differently by these two conditions.

In presenting the significance of labor turnover to supervisors we cannot, of course, afford to study all the nuances of meaning which are of interest to the personnel man or statistician. It is important, however, that the supervisor realize that labor turnover is an erosive force which eats into his constructive programs of planning, training, and production.

#### PRESENTATION OF TURNOVER DATA

The writer grants that it is possible to make purely statistical analyses of turnover figures prepared by the payroll department and secure worthwhile results. However, it is far more desirable that the initial source of labor turnover statistics be a final interview by someone in the Employment Department of all employes leaving the company for any cause whatsoever. It is seldom that an employe overcomes natural inertia and makes an overt step like changing his job unless there has been a number of different causal factors. Hence it is extremely difficult for a final interviewer properly to classify reasons for leaving. At best, he must exercise considerable judgment in evaluating the statements given by the departing employe.

The bookkeeping of labor turnover is rather laborious but highly essential. There are two general methods in current use:

1. The ledger method. By this plan, often in simple tally form, each departing employe is checked out under his particular department and also under a generalized cause for leaving and each new employe is checked in or debited against the department to which he is assigned. At the end of the period it is necessary merely to total the entries.

2. By use of a statistical card. This plan allows for the recording of more information about the employe and his reasons for leaving. When an applicant is accepted, a statistical card, such as used under the Hollerish or Powers Systems, is initiated. Usually this card will show some of the items on the application blank, such as age, education, marital status, color, job and department, and date started. If the employe leaves, the card is completed to show the date of leaving, specific reason, immediate superior, and other pertinent bits of information. The statistical card method permits of almost endless classification and cross-analysis, if desired.

The issuance of detailed statistical reports at regular intervals for the

information of supervisors is essential. Usually such statistical reports are issued monthly, although some concerns attempt a weekly labor turnover report. For each sub-department or gang this report should show at least the following:

Average number of employes on roll (average number working, if possible)
Number of individuals employed, number transferred into the department, number transferred out, number left the company, and the percentage of labor turnover based on those whose names have disappeared from the company payrolls.

Other items frequently found on the labor turnover report are:

Number resigned, number discharged, number laid-off, number died, and number left for other causes; turnover of previous year.
Average length of service of those leaving; percentage of exits having one year's service or more; percentage of present force having one year's service or more.

It is desirable to keep a running record of monthly labor turnover in chart form so that supervisors may readily compare present performance with the past. Such charts may show comparisons of labor turnover by plants, by departments, or by foremen. Many question the advisability of comparing the labor turnover of one plant with another because the local factors usually make such comparisons valueless. Another type of chart is that which presents an analysis of turnover by kinds (voluntary, involuntary, etc.) and specific causes. Still a third type of chart, which is occasionally seen, is that which compares the labor turnover curve for a period of years with the labor turnover of a community or with other indices of the business cycle.

### SELLING THE SUPERVISORS

It is essential that the foreman be made to feel considerable responsibility for labor turnover. He should absorb the following information:

1. Different companies have such entirely different working conditions and labor standards that an intercompany comparison of labor turnover indices has very little value. However, the comparison of present labor turnover with the previous experience of that particular company is very valuable.

2. There is usually a correlation between the variations of the labor turnover curve of a company and the seasonal and cyclical variations of common business indices. Hence a rise or fall in labor turnover curve must be interpreted in the light of general business conditions before alarm is felt or congratulations offered.

3. A large portion, usually about 80 per cent, of all labor turnover is voluntary. There is here much food for thought and discussion.

4. Labor turnover is greatest among new employes.

5. The supervisor should diagnose whether his turnover is occurring in but a few jobs, or whether it is general—and prescribe accordingly.

6. The foreman or supervisor should not have the authority to dismiss an employe from the company—his authority should be limited to his own particular department or gang.

The supervisor should be made to understand the value and justice of this policy.

7. Laying off men is a costly business both to the employe and the company, for all the overhead costs continue whether work is produced or not.

8. The factors which enter into the cost of labor turnover should be presented. Various estimates made by different authorities might well be made the subject of study. If it is desired to crystallize the cost of hiring and firing one man the figure of $50 appears to be a fair estimate.

Facts about labor turnover should be put across to foremen and supervisors by as many different channels as the ingenuity of management can open. Among these may be mentioned regular and special conference meetings; competition among foremen for a reduction of the turnover figure, such as is frequently carried on in safety first drives; discussion in foremen training classes of the regular monthly reports previously mentioned; requests from management for written explanation of high turnover, and similar constant stimulation.

### HOW SUPERVISORS CAN REDUCE TURNOVER

Constructively, the supervisor should be made to realize that he can help reduce labor turnover:

1. By a clear analysis of jobs under his jurisdiction. If he interviews and selects his own men, such analysis would be of value to him for that purpose; if he places a requisition with the Employment Department, he should be very specific in stating the requirements of the job.

2. By training men in the proper habits necessary to perform their work. This is especially true of new employes who are readily discouraged by their inability to keep pace with their fellows or purely by the strangeness of a new environment. A word of cheer is a valuable training device.

3. By dismissing a man only after calm consideration, never in anger.

4. By transferring a man who may be misplaced in an endeavor to find a better niche for him.

5. By recommending competent employes for other or higher positions, where they will serve the company better. This connotes a broad company viewpoint on the part of the supervisor.

6. By developing all-round men capable of smoothing out the minor peaks of work within the gang. Amplification of this idea is found in some companies in the development of "flying squadrons."

7. By studying the occupations in his department where the labor turnover is highest—and discovering why.

8. By studying the causes of voluntary quits, preferably by first-hand questioning of his men, but also by correlation with the final interviewer in the Employment Department.

9. By planning production and labor requirements in advance.

10. By avoiding lay-offs wherever possible, especially those due to weather.

11. By working with his men as a leader, so maintaining interest, offsetting false views and becoming per-

sonally acquainted with each of his men.

There is a message in labor turnover for the higher executives of management. They too can help in its reduction:

1. By avoiding the over-development of plant capacity.
2. By planning long time sales and production programs.
3. By leveling off seasonal production and peak levels.
4. By instilling sound and just labor policies, especially of promotion and compensation.

In a sense this paper is a warning and a protest against the mere compilation of statistical data without any attempt to load them into the proper guns and shoot them over the firing line.

(*Manuscript received October 29th, 1926.*)

# Why Employees Leave: Company Records and Analysis of Causes of Exits[1]

By Lloyd R. Miller, *Metropolitan Life Insurance Company*

*The exit interview and its uses in analyzing labor turnover received emphasis at the joint meeting of the Personnel Research Federation and the American Statistical Association on October 8th, 1926. Mr. Miller's paper, read at this meeting, presents in stimulating and authoritative form the experiences of policyholders of the Metropolitan Life Insurance Company with the exit interview as one means to increase labor stability.*

This paper discusses the practice of systematically obtaining and recording reasons for exits and then taking whatever action is necessary. Experience has shown the following results of this practice: (1) Prevention of arbitrary discharge by foremen or department heads and better understanding of way to handle men. (2) Disclosure of personal grievances and misunderstandings. (3) Reduction of turnover due to improper selection and placement. (4) Exposure of unsatisfactory working conditions. (5) Exposure of unsatisfactory personal, home, and community conditions, some of which can be corrected. (6) Development of employee good will.

Reference is made to the increasing number of firms using the exit interview. Reasons are given for its failure to produce results in some companies.

THE purpose of this paper is to outline one method of improving the relations between employer and employee. The method affords an opportunity for a company to learn systematically what the employees think of its policies; it makes it possible to correct false impressions regarding the company and to change conditions which hinder efficiency and lower morale. The outstanding features of this method are: (1) Learning through interviews at the time of exit why employees leave; (2) recording this information in convenient form to show such facts as department, occupation, and reason for leaving; and (3) taking the necessary action to improve the efficiency of the organization and to reduce costs. It is not proposed to advocate any one record form nor to discuss the merits of individual items to be included on such forms, but rather, first, to con-

[1] Read at a joint meeting of the Personnel Research Federation and the American Statistical Association, New York, October 8th, 1926.

sider the value of studying the causes of labor turnover, and second, to suggest possible ways in which this method can be applied and improved. Questions taken up will be: How did the idea develop? What has been the experience of companies using this method? Has their number increased or decreased? What factors influence success and failure? How can the procedure be made more effective?

### HOW THE IDEA DEVELOPED

During the first fifteen years of the twentieth century manufacturing methods, equipment, and ideas were undergoing radical changes. Manufacturers were invading foreign markets and organizing great industrial combinations. Production executives were solving problems arising out of the use of many new inventions. Foremen frequently discharged workers arbitrarily, trained men were displaced by new machines, and business had many ups and downs—all contributing to increase labor mobility. Meanwhile public-spirited citizens became interested in preventing unemployment, and executives began to realize that further efficiency in manufacturing could be obtained by better labor management.

These executives were stimulated first by the excessive amount of their labor turnover and its cost. As director of training at the West Lynn Works of the General Electric Company, Magnus W. Alexander realized the savings to any company which come by maintaining a stable work force, and his estimates of the cost of labor turnover made in 1913 played a real part in focussing attention on the problem. Mr. W. A. Grieves began a study of turnover at the Jeffrey Manufacturing Company in 1912 and arrived at conclusions substantially similar to those of Mr. Alexander.

Other men approached the matter from an interest in scientific management. As a part of the Taylor system, several plants installed employment departments as early as 1910. Each gave the employment superintendent full control over that function, thus taking away from the foreman his absolute authority in the matter of discharge.

By 1916 the stoppage of immigration and the return to Europe of many reservists had caused an acute shortage of labor. Associations of employment managers were organized in some of the principal centers of industry and a new idea began to crystallize. While there had been a tendency to attack the high cost of excessive turnover blindly with the thought that a reduction by any means meant economy, personnel managers began to realize that there were many times when an employer was better rid of an employee. It became apparent that no matter what the definition of turnover, no single figure would give the management a true picture of what was going on in the shop or office. One way to obtain this, it was thought, was to make provision for systematically learning why employees leave—to find out their opinions regarding the company and to use this information in order to improve conditions.

Perhaps the first general program with reference to the study of the

causes of turnover was outlined by a committee of the Employment Managers Association of Boston of which the chairman was Mr. E. H. Fish of the Norton Company. Forms for recording and analyzing the causes of leaving by departments and for the plant as a whole were drawn up. Arrangements were made to have these published by the Library Bureau, with headquarters in Boston, and sold to interested employers.

Since that time other organizations have become interested along similar lines. Typical of these are:

1. Department of Industrial Research of the Wharton School of Finance and Commerce.
2. National Metal Trades Association.
3. Metropolitan Life Insurance Company.

### WHAT HAS EXPERIENCE SHOWN?

Where employees are interviewed and records are kept and properly used, what practical results can a company reasonably expect? Experience shows at least six possible results:

1. Prevention of arbitrary discharge by foremen or department heads and a better understanding of how to handle men.
2. Disclosure of personal grievances and misunderstandings.
3. Reduction of turnover due to improper selection and placement.
4. Exposure of unsatisfactory working conditions.
5. Exposure of unsatisfactory personal, home, and community conditions, some of which can be corrected.
6. Development of employee good will.

Suppose we consider some actual cases observed this year. Upon being asked whether or not exit interviews prevent arbitrary discharge, the employment manager of a rubber company said:

> I believe they have a beneficial effect on foremen. I make a practice of dealing individually with the foremen as much as possible. For example, sometimes when I learn of a man's grievance or misunderstanding, I call in the foreman to hear what the man has to say. Hot words follow and the man doesn't stay, because we back up the foreman in order to preserve discipline; yet when a similar case comes up, the foreman thinks before he discharges the man.

As another case, consider the experience of a company manufacturing motor cars as reported by its employment manager.

> There is an effect upon executives and foremen throughout the plant when they know that every man who leaves is interviewed. For instance, a foreman would not desire a man to come down here and say that the boss swore at him or in any other way treated him unjustly. There also is a possibility of baseball pools and other evils creeping into a large plant, reports of which we often get through a man who is quitting. We have had cases where a foreman took money for picking out good jobs for certain workmen. On matters of this kind there usually comes a falling out, and when the employee comes to this department on his way out, we make a clean-up. I think we sometimes over-estimate the seriousness of labor turnover, but the matter of exit interviews is a vital part of our employment system. Our endeavor is to apply the remedy immediately and not wait for executive action, thereby getting rid of a good deal of red tape.

Then there is the man who cannot agree with his foreman as to the duties of his job. In a plant manufacturing steel tools, it was found that arguments sometimes arose between good

workmen and their foremen. In one case when a foreman gave an order, a workman replied, "That's not my job." A heated argument followed and as a matter of discipline the foreman was forced to dismiss the man. The employee stated in strong language that he wouldn't work in such a plant. In this case the employment superintendent talked the matter over with both men. He called the foreman's attention to the value of keeping a good man and the fact that the situation was largely the foreman's fault because the details of the job had never been explained fully to the man. To the workman he pointed out that the foreman had to keep discipline and was really a good fellow. By showing each the other fellow's viewpoint, the matter was straightened out and a good workman saved.

Just as this method is a check on the foreman, it is also a check on the employment manager himself. As one employment manager said, "Studying the causes of turnover is valuable to us because in this way our own mistakes come home to roost." An office manager's experience illustrates this point further. Upon glancing over his past turnover record, he discovered that seven out of eleven stenographers had been discharged because of incompetency. None of these girls had been with the company more than five weeks. These seven cases were discussed in detail by the office manager with his subordinates, with the result that greater care was taken in the selection and placement of new applicants for such positions. In a New England factory the employment officer thought that because he interviewed everyone who left he was more familiar with the type of man to hire for certain jobs.

Sometimes unsatisfactory working conditions are brought to light by learning the employee's viewpoint. Speaking of this, the assistant treasurer of a New York bank who keeps a record of labor turnover on his desk at all times and interviews personally every clerk who is hired or leaves, said:

> We found that a number of employees were leaving on account of night work in one of the departments. As a result we now have two shifts and the turnover for that reason has been eliminated.

Complaints against the poor ventilation in one department were received by a Rhode Island manufacturer in the course of final interviews. These were taken up with the works manager and a new ventilating system was installed, which soon reduced labor turnover on the jobs immediately affected.

On the other hand, labor mobility is frequently due to conditions outside the plant although not necessarily outside the control of the employment department. The director of employment of a steel mill states:

> When we learn that employees are leaving on account of financial troubles we often keep them by helping them straighten out their financial difficulties.

Other results may be summed up under the heading of good will. A textile plant found that many people left work for rather vague reasons,

often restlessness. Regarding this, the company said:

> We have a great many people with us now who have returned a second time and make better workers than at first. Often the leaving interview makes an employee feel kindly toward the firm and anxious to come back. This is particularly true of women and young boys.

A somewhat similar opinion was expressed by an Ohio manufacturer who said, on being asked about the effectiveness of exit interviews, "These should have an effect on the community because of the assurance that every man will be given a hearing and a square deal."

### IS THE USE OF TURNOVER RECORDS INCREASING?

The facts at hand indicate an increase in the number of companies which use personnel records showing the causes of turnover. The Rand Kardex Bureau, of which the Library Bureau is now a part, stated that during the past year or so the original form has not been as frequently sold as heretofore. There has been a tendency for companies to order forms arranged slightly differently in order to carry out in detail some of their own ideas on the subject. Practically all of these forms have been based upon the one originally prepared.

Since 1917–1918 several individuals, associations and organizations have supplemented the activity of the Library Bureau. The form drafted for group policyholders of the Metropolitan Life Insurance Company some four years ago alone has increased by over 100 the number of companies using such records. In addition, there are scores of firms which began printing their own records about 1919–1920 and continue to use them. So, while no figures on the number of companies using such forms are available, it seems reasonable to conclude that the number is growing and that there is a tendency away from uniform records.

### WHY TURNOVER ANALYSIS FAILS

Suppose we consider a few typical cases of companies failing to continue this method. A manufacturer of glass decided, in a burst of enthusiasm, to study the causes of his turnover. In the main plant perhaps 175 people were employed, and for the past few years the foremen had been reporting the reasons for leaving although no use was made of the information. So as a measure of economy the manufacturer began his study by searching these old records and analyzing the last six months' experience. Quite naturally, the final report was rather a dead affair and little valuable information was obtained from it. In addition, it was found that with the exception of the common laborers, labor turnover was too small to warrant detailed study.

Take another case of failure. In a New York printing plant employing about 200 people, the personnel activities, such as they were, were handled by the accountant who was responsible to the superintendent. Becoming interested in labor turnover and its causes, he thought he saw a way to increase his prestige with the superintendent. After gaining half-hearted approval of his plan, he asked

each foreman to report in the future the reasons why each employee left. Later, taking the perfunctory comments set down on the foremen's reports, and by dint of careful clerical labor he classified and entered these causes in pretty columns. As no conclusions could be drawn from the final analysis, the superintendent was not interested, the foremen were not interested, and the idea discarded.

Then there was a dealer in china and glassware who asked to be furnished with forms to use in studying the causes of his labor turnover. One year later, upon being asked what the results had been, he replied, "Our turnover has been fairly steady and I don't notice much change in the reasons from month to month." This company employed only 50 people.

Still further ideas come from a metal manufacturer, who said:

> We had some turnover analysis forms printed sometime ago, but when we put them into use we found our turnover was less than one percent per month and practically all the sheets were turned back to us blank by the various department heads to whom they were issued. Even when two or three names appeared on a sheet we knew the foremen had done everything possible to keep the men. The idea of studying the causes of turnover is excellent when applied to a plant where turnover is relatively high. It tends to give the foremen the very training which we have instituted at our plants through other means.

Upon further inquiry it was learned that this company had had difficulty in classifying the reasons for leaving according to the code adopted. There was a lack of coördinated data. A later letter from the company, however, stated:

> Our judgment may have been premature because of the fact that it was arrived at before enough time had elapsed and enough cases recorded to determine correctly whether the record was valuable. We heartily agree with the thought that only by careful analysis of the actual reasons for people leaving can any plant or any industry hope to remedy the conditions responsible for labor turnover.

With the help of such illustrations as these, can we set down the reasons why such procedure has failed? There are at least eight of these. They are:

1. It is faulty to believe that the sole object of studying the causes of turnover is to reduce its amount. This point of view overlooks three things:
   *a.* The wholesome effect of certain kinds of turnover.
   *b.* The valuable information which can be obtained through turnover analysis and used to increase plant efficiency and build morale.
   *c.* The fact that turnover is a symptom of other sources of loss often greater than the loss due to turnover.
2. *Some companies are so small that this procedure is unnecessary.* The officers know each worker personally and the desired results can be obtained without a formal system of interviews and records.
3. *The costs of interviewing and record keeping are not kept.* Each company will have to determine for itself how costly this item is. However, this cost is not necessarily excessive.
4. *A mere tabulation of the causes of leaving is not sufficient.* Each separation is an individual case problem and should be considered as such. Unless such an attitude is taken turnover analyses will all look very much alike. No system runs itself and no company can expect to issue an order requiring someone to enter the causes of leaving on a blank form and then believe conditions automatically will be improved.
5. *Inaccurate information may be due to inferior rank of interviewer and consequent lack of remedial action.* It is important that

the interviewer have sufficient prestige to command the respect of employees, a personality calculated to win their confidence, and authority to take action himself or to present his recommendations to a superior who will thoughtfully consider them.

6. *There may be lack of interest and understanding on the part of foremen and other officials.* It is important to have the foremen realize that labor turnover is a problem for them to consider along with others relating to efficiency and costs.

7. *There may be lack of confidence in the employment department or interviewer.* Unless a company can convince employees that it is fair in its dealings and that it welcomes complaints made in the proper spirit, it is difficult to obtain accurate information.

8. *The company may pay high wages, have excellent working conditions, train its foremen successfully in handling men, and provide channels for grievances.* Under such conditions the value of this procedure is lessened because there are other methods of finding out what the workers are thinking.

## SUMMARY

The sole purpose of this paper has been to present the idea of systematically finding out and recording the reasons for exits and taking whatever action is necessary. Illustrations of the results actually obtained were given, reference was made to the increasing number of companies following this method, and cases were cited to show why failure has come.

To sum the matter up, an employer has two alternatives. He can say, "All this sounds very well but I can't be bothered with systems and records. When I lose a man I hire another." If such is his attitude he must take the consequences. No matter how efficient and trustworthy his subordinates, they will not act as he himself would act. When he is called away on business he will be held responsible for the acts of his lieutenants—unjust discharges, petty tyrannies, etc.—many of which he will never even hear of. Neither is it a matter of merely losing one man and hiring another. When he loses an employee it tends either to make or to mar his reputation in the labor market. Every employee who leaves with a grievance makes it harder for him to hire good workers in the future. If he questions this, let him go down to the local employment agency, sit there unobserved, and listen to the remarks made about him. "Send me anywhere but there," one man will say, "I don't want to work for those people. Why? Well, a friend of mine worked there once." Such comments as these will make an employer realize the consequences of such a policy.

Then there is the other alternative. He can adopt such a plan as is described in this paper. If he follows it, grievances will come to light, his subordinates will try to conform to his labor policies, "sore spots" in the organization will heal more quickly, and a longer line of high grade workers will form outside the employment office. Such an employer doesn't worry about records or systems. He is convinced that a frank man-to-man talk with dissatisfied employees is profitable. If he records the reasons given by the employee and studies these occasionally to refresh his memory, that also is worth while. Certainly it is not to him a complicated system. If he finds it unnecessary to talk personally with every employee

who leaves, and in certain cases learns the facts from someone else, he considers this not the breakdown of a system but merely common sense. In short, he believes it will pay him to learn what his employees think of him and to give them a correct impression of him.

The employer must decide which alternative he will take. What is our part in the matter? One suggestion is enough. The exit interview is the keystone of the procedure previously described. Can we not improve the art and technique of conducting such interviews?

An interviewer is handicapped in two ways. Some people will not tell him the truth; others cannot because they are not used to analyzing their own motives. In either case, an interviewer can put himself in the employee's place. He can learn the factors which might have influenced the employee. He can decide how he would have acted under similar conditions.

What are some of these conditions? They relate either to the man himself, his job, or his family and home. For example, is he ambitious, conscientious, accurate, etc.? What training has he had? Would he like to work for the same foreman again? Has his address changed since being employed? How many people are dependent upon him? Much of this information can be obtained before the final interview from personal history cards, production records, and efficiency ratings.

Labor will never be efficient, neither can the lot of the laboring man be a happy one unless industry consciously develops more human contacts between employer and employee, more understanding on the part of each regarding the other's problems.

(*Manuscript received October 8, 1926.*)

# An Intelligence Test for Stenographers[1]

By Sadie Myers Shellow, *Milwaukee Electric Railway and Light Company*

*Dr. Shellow has proved once again the ease with which stenographic ability can be measured. She has also demonstrated afresh that intelligence test scores differentiate between levels of responsibility in the same occupation. Her test findings are being put to good use in the firm with which she has been associated for the past three years.*

The author describes an intelligence test which was devised for the purpose of supplementing a trade test for the selection of stenographers. Twenty-four stenographers served as subjects. The criterion was a ranking by an examiner who knew their work at first hand and who took into account salary earned, difficulty of work handled, and opinions of department heads. Correlations obtained were: Intelligence test with ranking 0.73, trade test with ranking 0.48, intelligence test with trade test 0.12, and both tests combined with ranking 0.59.

FOR two years the author has been experimenting on the selection of stenographers. Use has been made of a battery of tests compiled from well-known standardized tests, with the addition of some special problems. The aims of the tests have been to discover proficiency in the taking and transcribing of dictation, typing, spelling, punctuation, and grammar. This group of tests was standardized and results have been on the whole very satisfactory. Occasions have risen, however, when simply the ability to handle the technical work of a stenographer was not sufficient qualification for the job. During the course of the follow-up, it was discovered that there were certain abilities which a stenographer should have besides technical training and experience. She should be able "to use her head." In other words, general intelligence is a very vital necessity for a good stenographer. Especially is this true for semi-secretarial positions, where considerable responsibility is thrown upon the stenographer. Heretofore the interview had served as a rough guide to the intelligence of the applicant, but it was deemed advisable to supplement this with some form of objective test.

[1] The author wishes to acknowledge her indebtedness to Mrs. Zilla R. McClure, who assisted throughout the study and took infinite pains in assuring as accurate a ranking of the group as possible.

## DESCRIPTION OF THE INTELLIGENCE TEST

The intelligence test was built on the general principles which have been used over and over again in various

tests for mental alertness. The subject matter, however, was made germane to the problems with which stenographers must deal. The sentence completion test aims to discover whether or not the applicant can supply suitable words where omissions have been made. The judgment test presents situations with which a stenographer must deal. Rules for spelling and grammar, paragraphing, and the like reveal the applicant's background of experience. The spelling and paragraphing tests which had been given previously were included. Analogies and proverbs were also used.

### SUBJECTS

Twenty-four carefully selected subjects were used for purposes of standardization. Three general groups were included. Group A consisted of those who were known to be the best stenographers of the company, and who held the most responsible positions, usually stenographers to department heads (semisecretarial). Group B consisted of the average good stenographer whose responsibility was more limited, but who was known to be doing good work. Group C consisted of those holding stenographic positions which require very little responsibility and training. Only those were included whose salaries were consistent with the type of work they were doing.

### PROCEDURE

The test was given to the group as a whole, but individual time records were kept. The time ranged from twenty-three minutes to forty-four minutes. The test in its present form is a self-administering test. The separate parts are not broken up, but the time for the entire test is taken.

### SCORING

The method of scoring each separate part of the test is as follows:

| | |
|---|---|
| Sentence Completion | Number Right |
| Tabulation | Number Right |
| Syllabizing | Number Right<br>Minus ½ Number Wrong |
| Spelling | Number Right |
| Abbreviation | Number Right<br>Minus ½ Number Wrong |
| Paragraphing | Number Right |
| Judgment | Number Right<br>Minus ½ Number Wrong |
| Analogies | Number Right<br>Minus ½ Number Wrong |
| Proverbs | Number Right<br>Minus ½ Number Wrong |
| Sentence Correction | Number Right |
| Grammar Rules | Number Right |

The total score is the sum of the separate test scores. A correction is made in order to give weight to the time element, giving added credit to those who think rapidly. The formula for the corrected score is given below.

$$\text{Corrected Score} = T + \frac{10 \times R}{\text{Time} + W}$$

$T$ = the sum of the separate scores; $R$ = the number right; time is computed in minutes; $W$ = the number wrong.

### CRITERION

It might seem at first glance that a group of twenty-four selected subjects could not yield reliable results. This would be true if one could not be certain of the basis of selection. No

subject was selected whose work was not well known by the person who had been in charge of giving the selection test to applicants for stenographic positions. Those stenographers who had been in service for a period of years had been tried out on various other tests during previous standardizations, and their ability was well-known. Wherever there was doubt concerning the abilities and responsibilities of any stenographer, the department head or supervisor under whom the stenographer worked was consulted, and the caliber of her work was definitely established. These twenty-four stenographers were then ranked in order from one to twenty-four by the examiner. This ranking was based on the difficulties of the work which each stenographer handled, together with the ability shown in handling this work, and the satisfaction given to the employer. The amount of salary paid was also an item which was considered.

In view of the fact that the various stenographers came from different departments, it was impossible to get a second person who could rank all of them. However, it was found that the ranking of one reliable person who had carefully watched the progress of each of the subjects was of more value than the dubious ratings of five or six supervisors who were not personally familiar with those outside of their own department.

Of the group of twenty-four subjects, sixteen had at some time or other taken our regular standardized trade test for stenographers. These scores were also used as a criterion against which to check the intelligence test. A low correlation was hoped for, since it was the purpose of the intelligence test to discover abilities not manifested by the results of the trade test. The final score, or so-called combined score, consisted of the corrected score in the intelligence test plus the score in the trade test.

### CORRELATIONS

The following correlations were found:

| | |
|---|---|
| Intelligence Test with Ranking | $+0.73 \pm 0.06$ |
| Trade Test with Ranking | $+0.48 \pm 0.13$ |
| Combined Score with Ranking | $+0.59 \pm 0.11$ |
| Intelligence Test with Trade Test | $+0.12 \pm 0.17$ |

The high correlation +0.73 of intelligence test with ranking speaks very well for the validity of the test. At the same time, the very low correlation of +0.12 between the intelligence test and the trade test shows that these two tests do not overlap, but supplement each other. A correlation of +0.59 is as good as one could expect for the combined score with the ranking.[2] The trade test alone does not yield as high correlation with the ranking as when it is combined with the intelligence test. It is therefore obvious that the addition of the intelligence test improves the validity of the selection method.

(*Manuscript received August 2, 1926.*)

[2] In spite of the small number of cases, it is possible that a better combination of scores may be obtained by the use of multiple correlation. The multiple correlation coefficient of rankings with a combination of intelligence test scores and trade test scores is 0.83.—*Editor.*

# Reliability of Average Ratings

By Arthur W. Kornhauser, *University of Chicago*

*This is the second in a series of four articles by Dr. Kornhauser on rating scales, the first of which appeared in the* Journal *for September, 1926. While the data were gathered in a college, the findings are applicable wherever rating scales are used. Several points regarding ratings which have long been suspected of being true, are here brought to an experimental test. One very important point is that in order to insure maximum reliability in ratings, the average of four sets should be used.*

Two groups of college students were rated by varying numbers of instructors, using a graphic rating scale for seven traits. The reliability of these ratings was determined in two ways:

1. The clearness of differentiation of average ratings was observed. The spread of average ratings was greater in most traits for Group A, consisting of 18 seniors, than for Group B, consisting of 50 students of all classes. The author concludes that the exceptionally high and exceptionally low students appear to be distinguished with a considerable degree of reliability, but the reliability of differences among the mass of average students is not great.

2. Averages of sets of 3 ratings (chosen at random) on each student were compared with averages of other sets of 3 ratings also chosen at random. For Group A the average correlation of set I with set II was 0.67, ranging from 0.34 for initiative to 0.78 for industry. Two other sets of three ratings chosen in the same way gave substantially the same results. For Group B this process gave coefficients of lower value, averaging in the forties. This was probably due to the smaller range of ratings.

The author also correlated sets of average ratings, varying the number of ratings entering into the average. He concludes that the reliability of average ratings increases steadily with an increase in the number of separate ratings entering into the averages, up to four, and beyond four no further change in reliability occurs.

IN THE use of rating scale estimates, the common practice is to take averages of the several ratings assigned each individual on each quality. These averages are considered more stable and "fair" than are the separate estimates of single raters. Occasionally, statistical means are employed, before the averaging is done, to make allowances for differences in the rating standards of the several judges. But this procedure is rare, partly because of the labor involved and partly because of special conditions which sometime make it appear unwar-

ranted.[1] The usual practice is to average the original ratings.

The present study is an attempt to determine the reliability of a set of ordinary average ratings of the kinds just described. The ratings are probably typical of estimates secured on a large scale in a more or less routine fashion. While the data are ratings of students by instructors, there is little reason to suppose that the findings would be markedly different for ratings of industrial groups.

## THE RATING PROCEDURE AND DATA

The statistical analysis is based upon two sets of data—faculty ratings of two groups of students in the School of Commerce and Administration of the University of Chicago. The first group consisted of graduating seniors in 1922; the second group included all classes in the School during the following year. Ratings were given on a graphic rating scale containing seven qualities. (See figure 1. The reverse side of the card calls for a few additional items and contains space for remarks.) The qualities were defined as follows:

*1. Intelligence.* Consider the student's ability to learn and to assimilate new ideas and see relations; his adaptability, resourcefulness, alertness, judgment, and common sense. Does he reason clearly, understand complicated explanations, show critical ability and analytical powers?

*2. Industry.* Is he energetic in his regular daily activities? Does he use his time and ability to good advantage or does he tend to do as little as the traffic will bear?

*3. Accuracy.* Consider the care and exactness with which the student performs his work. Is he painstaking and particular in his thinking and expression (oral and written)? Does he manifest any tendency to be slipshod?

*4. Coöperativeness.* Consider the effectiveness with which the student coöperates both with other students and with faculty and administrative officers. Is he free from extreme selfishness and overindependence in his attitudes?

*5. Initiative.* Consider the student's success in doing things in new and better ways; his progressiveness in creating and using new methods and ideas; his energy in "putting across" novel undertakings.

*6. Moral trustworthiness.* Consider the general dependability of the student, his freedom from dishonesty or deceitfulness, his frankness, sincerity, and self-control. How far can you "swear by him"?

*7. Leadership ability.* This quality depends in part upon all the others. But over and above these, consider here all those additional qualities that have to do with the student's ability to induce men to work together effectively. Does he win coöperation, inspire confidence, and naturally dominate his group?

The raters' checks are translated into numerical ratings running from 1 to 10.

In the rating of the graduating class (to be known as Group A), each instructor was given a list of the students and asked to rate all those who were fairly well known to him. The other set of data (for Group B) was obtained in accordance with a systematic plan for the periodic rating

[1] Two difficulties especially are involved: (1) each rater often has not rated enough people to give an adequate view of his general tendency; (2) the "correcting" assumes that the groups rated by different raters are equivalent—an assumption which is frequently not justified. These obstacles can be overcome where it is possible to have each rater give a large number of estimates of people in a specified "standard" group. This is rarely done, however.

**GRAPHIC RATING CARD** Name of Student_____

Judge the student in each quality, independently of all other qualities. Indicate your rating in each quality by placing an "X" on the line, at a point that approximately reports the student's standing.

| | | | | | |
|---|---|---|---|---|---|
| 1. Intelligence | Keen thorough thinker | Alert; good judgment | Fair understanding; common sense | Learns poorly; unsound thinker | Dull; poor judgment |
| 2. Industry | Exceptionally industrious | Steady hard worker | Fairly industrious | Takes things easy | Lazy |
| 3. Accuracy | Extremely accurate and careful | High degree of accuracy | Moderately accurate | Inexact; somewhat careless | Slovenly |
| 4. Co-operativeness | Unusually willing co-operation | Good team-worker | Fairly co-operative | Difficult to work with | Trouble-maker; antagonistic |
| 5. Initiative | Creative; aggressive; original | Energetic; some originality | Moderately independent | Lacks originality or aggressiveness | Routine worker; passive |
| 6. Moral Trustworthiness | Merits complete confidence | Recognized as trustworthy | Fairly reliable | Doubtful reliability | Untrustworthy |
| 7. Leadership Ability | Capable, forceful, winning; "born leader" | Leads well under most circumstances | Fairly effective leader | Unable to lead; unimpressive | Submissive antagonizing or repellent |

FIGURE 1

of all students at the close of each school quarter.

### DIFFERENTIATION AMONG STUDENTS BY THEIR AVERAGE RATINGS

The two sets of data are first examined to determine how reliable the average ratings of students are. The reliability is measured in two ways: first, by noting the clearness of differentiation among the average ratings, and second, by finding the amount of correlation between different sets of average ratings of the same students. The first of these methods is dealt wth first.

The question is: How well do the ratings bring out differences among the students rated? To answer this question, the average ratings received by a number of students have been compared to see how widely they differ from one another. The *average* rating in each trait is studied

TABLE 1

*Distributions of average ratings of eighteen students in Group A. Each rated by 7 to 13 instructors*

| TRAITS RATED | AVERAGE RATINGS* | | | | | | | | | | | | | AVERAGE OF AVERAGE RATINGS | A.D. OF AVERAGE RATINGS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Below 4† | 4 | 4.5 | 5 | 5.5 | 6 | 6.5 | 7 | 7.5 | 8 | 8.5 | 9 | 9.5 | | |
| Intelligence | | | 1 | | | 3 | | 4 | 5 | 3 | | 2 | | 7.2 | 0.81 |
| Industry | 1 | 2 | | | | 1 | 1 | | 4 | 4 | 4 | 1 | | 7.1 | 1.40 |
| Accuracy | | 1 | 1 | | 3 | 1 | 4 | 2 | 3 | 2 | 1 | | | 6.6 | 0.96 |
| Cooperativeness | 1 | | 1 | | 2 | 1 | | | 3 | 4 | 1 | 1 | 1 | 7.3 | 1.36 |
| Initiative | | | | 1 | 1 | | 5 | 5 | 4 | 1 | | 1 | | 6.9 | 0.63 |
| Moral Trustworthiness | | | 2 | | | 1 | 1 | 2 | | 1 | 3 | 2 | 6 | 8.0 | 1.39 |
| Leadership Ability | 1 | 1 | | | 1 | 1 | 1 | 4 | 7 | 2 | | | | 6.8 | 0.92 |

* To the nearest half unit.

† The actual averages in this column are: Industry 2.5, Coöperativeness 2; Leadership Ability 3.5.

TABLE 2

*Distribution of average ratings of fifty students in Group B. Each rated by 7 to 10 instructors*

| TRAITS RATED | AVERAGE RATINGS* | | | | | | | | | | AVERAGE OF AVERAGE RATINGS | A.D. OF AVERAGE RATINGS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4.5 | 5 | 5.5 | 6 | 6.5 | 7 | 7.5 | 8 | 8.5 | 9 | 9.5 | | |
| Intelligence | 1 | 4 | 2 | 15 | 6 | 8 | 5 | 4 | 3 | 1 | 1 | 6.7 | 0.90 |
| Industry | 2 | 2 | 6 | 6 | 12 | 8 | 8 | 4 | | 2 | | 6.6 | 0.79 |
| Accuracy | 1 | 3 | 9 | 15 | 8 | 7 | 5 | 1 | 1 | | | 6.3 | 0.68 |
| Coöperativeness | | | 2 | 10 | 8 | 14 | 8 | 5 | 2 | | 1 | 6.9 | 0.65 |
| Initiative | | 5 | 10 | 10 | 7 | 9 | 7 | 2 | | | | 6.3 | 0.74 |
| Moral Trustworthiness | | 2 | | 6 | 5 | 13 | 8 | 6 | 8 | 2 | | 7.3 | 0.78 |
| Leadership Ability | 2 | 4 | 10 | 15 | 2 | 9 | 6 | 1 | 1 | | | 6.2 | 0.76 |

* To the nearest half unit.

since it is these averages that have usually been employed in the actual practical use of rating scale estimates.

The distributions of average ratings are shown in tables 1 and 2, for Group A and Group B respectively. Columns of averages and average deviations are added to facilitate comparison among the traits and between the two groups. In both groups and for all the qualities rated there are some fairly marked differences shown from student to student, though the scattering is far less than might have been hoped for. As indicated by the average deviations of the distributions of average ratings, Group A contains distinctly wider differences that Group B on the whole, though a slight reverse relationship appears in the traits Intelligence and Initiative. The average deviations of Group A average 1.07; those of Group B average 0.76. This difference is the more striking in view of the reasonable assumption that a class of graduating seniors (Group A) would be more homogeneous than a general group of students (Group B).

The same relationship is found in the distributions of ratings by the individual instructors, though the difference is less marked than in the composite ratings. The average deviations of the separate distributions average 1.33 in Group A and 1.12 in Group B. In every one of the seven traits, Group A shows a wider scattering than Group B for the instructors as a whole.

The explanation of the superior spread of ratings in Group A is probably to be found in the fact that in this group only those students were rated who were fairly well known by the raters. People less well known, as were many of the students rated in Group B, are regularly given ratings near the average. The fact that the differences in spread between the groups is even more favorable to Group A in the pooled ratings than in the original distributions by instructors, requires some further explanation. The significant point here is clearly the closer agreement among raters in Group A in the standing assigned to students. (Correlation figures actually show this difference.) In Group B there is more tendency than in Group A for a high rating received by a student to be offset by a low rating given by a different instructor. As a result, the combined ratings cluster more closely about the average in Group B.

Some attempt must be made to judge the significance of the differences found from student to student in average ratings. While probable errors methods are not applicable where the averages are based on as few cases as we have, nevertheless a few rough approximations may serve to indicate what might be expected.

The probable errors of the individual students' averages fall, with a few exceptions, between 0.1 and 0.5, averaging about 0.35. This means that any of the average ratings in the tables which differ from each other by 1.0 are fairly likely to express real differences. The odds are at least 3 to 1 against the difference being a chance one, and in most cases the odds are somewhere between 10 to 1 and 1000 to 1. In many instances

averages differing by less than 1.0 even by 0.5, are fairly sure to be reliably different. Where the differences between averages are as great as 2.0 and 3.0, the odds are overwhelmingly in favor of calling the differences real and significant.

It appears, then, that a great many of the differences in the tables are large enough to be significant. Many individual students are clearly differentiated from others who are rated distinctly higher or lower in certain characteristics. The exceptionally high and exceptionally low students, at least, appear to be distinguishable with a considerable degree of reliability. The reliability of differences among the mass of "average students," however, is not great.

### COMPARISON OF DIFFERENT SETS OF RATINGS OF THE SAME STUDENTS

The second method used for measuring reliability of average ratings may now be described.

The average rating of each student is made up from the estimates given by several instructors. A student is considered to be higher or lower than others on the basis of this composite rating. The question arises: Would the students have stood in the same order if they had happened to be rated by other instructors? To answer the question, all that is necessary is that we take two different sets of ratings of the students and compare the standing of the individuals according to Set I and Set II. The agreement between the two sets will be our index of reliability or consistency.

In Group A we took the ratings of all students rated by 6 or more instructors (24 in number), and selected sets of 3 ratings purely at random. Thus, if the student had received 6 ratings in Intelligence, we took any 3 of the 6 and averaged them; then the remaining three were averaged. This was done for each of the 24 students. (This gave Set I and Set II of the ratings.) The agreement between the 24 pairs of averages was ascertained, the relation being expressed in a correlation coefficient. This was done for each of the seven traits. The entire process was then repeated (Set III and Set IV) to see whether chance produced any great discrepancies. Both sets of coefficients of correlation are presented in table 3. On the whole, the agreement is reasonably close. The two series of coefficients also agree fairly well with each other.

In Group B a similar procedure was followed, using the 50 students whose average records were reported in table 2. The correlation coefficients are given in table 4. They are strikingly lower than those obtained in Group A. Another set of 105 records treated in the same fashion gave similar results. The correlations are shown in table 5.

The superior agreement in Group A as contrasted with Group B is associated with the other significant difference already noted, namely, the greater spread or scatter of ratings by instructors rating Group A. The average deviation of ratings in Group A (where each "rating" is now a median of three original ratings) average about 1.25; in Group B about 0.90. This difference in the spread of the numbers used in obtaining the

correlation coefficients is great enough to account in large part for the lower correlations in Group B. In non-statistical language the point is this: Students in Group A were more clearly discriminated from one another than were those of Group B (probably found in Group B, however, does not indicate that the results are so lacking in reliability as to be worthless. Even where the correlation between the sets of ratings is only 0.40, almost all students who are in the highest 20 per cent according to one set are

TABLE 3

*Correlations between independent sets of three ratings given to 24 students in Group A*

| | INTELLIGENCE | INDUSTRY | ACCURACY | COÖPERATIVENESS | INITIATIVE | MORAL TRUSTWORTHINESS | LEADERSHIP ABILITY | AVERAGE |
|---|---|---|---|---|---|---|---|---|
| Set I and Set II | 0.70 | 0.78 | 0.67 | 0.76 | 0.34 | 0.72 | 0.75 | 0.67 |
| Set III and Set IV | 0.72 | 0.86 | 0.68 | 0.77 | 0.42 | 0.78 | 0.67 | 0.68 |

TABLE 4

*Correlations between independent sets of three ratings given to 50 students in Group B*

| | INTELLIGENCE | INDUSTRY | ACCURACY | COÖPERATIVENESS | INITIATIVE | MORAL TRUSTWORTHINESS | LEADERSHIP ABILITY | AVERAGE |
|---|---|---|---|---|---|---|---|---|
| Set I and Set II | 0.50 | 0.44 | 0.44 | 0.34 | 0.43 | 0.21 | 0.45 | 0.40 |

TABLE 5

*Correlations between independent sets of three ratings given to 105 students in Group B*

| | INTELLIGENCE | INDUSTRY | ACCURACY | COÖPERATIVENESS | INITIATIVE | MORAL TRUSTWORTHINESS | LEADERSHIP ABILITY | AVERAGE |
|---|---|---|---|---|---|---|---|---|
| Set I and Set II | 0.48 | 0.58 | 0.49 | 0.34 | 0.40 | 0.38 | 0.38 | 0.44 |

because they were better known to the raters). Hence when different sets of ratings are compared, closer agreement is found in Group A, where the very high and the very low students were more clearly set off from the others.

The comparatively poor agreement above average in the other set, and almost all students in the lowest 20 per cent in one set are below average in the other. This degree of agreement is far from satisfactory, but it does mean that some cautious statements can be made concerning a student's probable characteristics.

### INFLUENCE OF NUMBER OF RATERS

A little further investigation was made to ascertain how paired sets of average ratings correlate, when each average is based on fewer than three ratings or more than three ratings. The results are given in table 6. The correlation coefficients point to the conclusion that the reliability of average ratings increase steadily with the increased number of separate ratings entering into the average, up to a composite of four ratings, and that beyond four no further change in reliability occurs. It is thus probable that the results given in tables 3, 4 and 5, are less favorable than similar coefficients based on sets of four ratings would be. How general the relationship is, we have no way of knowing at present, but it suggests that a minimum of four ratings should be obtained wherever possible.

TABLE 6

*Correlations between independent sets of ratings of 115 students, as affected by the number of ratings in each set*

| TRAITS | NUMBER OF SEPARATE RATINGS IN EACH SET | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Intelligence | 0.29 | 0.42* | 0.49* | 0.62* | 0.60* | 0.60 |
| Industry | 0.20 | 0.38 | 0.55 | 0.60 | 0.58 | 0.65 |

* These figures are averages of two to four coefficients calculated independently from different sets of data.

### INTERPRETATION OF RESULTS

When we come to attempt an interpretation of the disagreements in ratings which have been found, we are confronted with the question whether extremely close agreement is necessarily to be expected, even assuming that the separate ratings are accurate. The assumption is ordinarily made that to the extent that close agreement is not found, the ratings are unreliable and the rating procedure is ineffective. This view is based upon the conception of fixed general traits in the individuals rated. The task of the raters is to ascertain and record those definite traits. If the rating estimates disagree, obviously they are faulty estimates, according to this view.

But certainly something may be said for a different interpretation. Traits like Industry, Accuracy, Cooperativeness, and Initiative, are not necessarily permanent traits which appear under all circumstances and in all the individual's activities. In some classes, the student's behavior may be characterized by very different qualities from those present in other classes. Disagreements between ratings of the student may indicate that the student is different in different activities—not that instructors are wrong in their estimates. What is called unreliability of ratings may really be in large measure a matter of the specificity of traits.

There is a little evidence in our

data suggesting that this last interpretation is less important than it may at first appear. The fact that agreement of ratings is much closer in Group A than in Group B points to the conclusion that disagreement is in considerable part due to inaccurate and insufficiently informed ratings. It may be, however, that the superior agreement in Group A was due partly to the raters knowing a wider range of the behavior of the students rated.

The other bit of evidence is that the different traits do not show poorer agreement in proportion to their apparent specificity. Thus Accuracy and Industry, for example, are as well agreed upon as are Intelligence and Moral Trustworthiness, though the latter seem to be more general attributes of one's total activities. These lines of evidence are suggestive only. The extent to which disagreements are due to different instructors' observing different parts of the student's behavior, and the extent to which the disagreement is due to insufficient familiarity with the behavior in the range observed and to carelessness in rating, remain open questions.

(*Manuscript received June 5, 1926*)

# News Notes

## ACTIVITIES OF MEMBER ORGANIZATIONS

### *Vocational Service for Juniors*

As the result of recommendations made to the New York City Board of Education, regarding a program of vocational guidance and the establishment of counselors in the school system, an appropriation of $15,000 for the salaries of persons engaged in vocational guidance work was included in the school budget prepared in 1925. This item was approved by the City Board of Estimate in October, 1925, and eight counselors in junior high schools were to be installed during the school year 1925–1926. There has been considerable delay, however, in putting this plan into action and an unfortunate revision of the qualifications and salary schedule. An examination of the new type (true-false statements) for the selection of persons to fill these positions was finally given by the Board of Examiners on September 15, 1926, and attracted such attention as to be published entire in the School News Sections of certain New York newspapers. Seventeen candidates took the examination, from whom eight will be selected.

The customary activities of the Vocational Service for Juniors in junior high school counseling, in placement, and in high school scholarships have been continued. The age limit of young people eligible for its placement service has been raised from eighteen to twenty years.

The following is a summary of current research projects:

1. A brief follow-up study of the industrial careers of individuals who received scholarship aid during part or all of their high school course has been completed and submitted to the Vocational Guidance Magazine for publication.

2. A short study has been completed comparing the employment record of 100 boys and 100 girls, applicants at our Placement Office, with the report made by the Bureau of Women in Industry of the New York State Department of Labor in 1924 of 200 cases who, at the same chronological period, had obtained jobs by means other than a free employment agency. This study was made by Margaret Barker of their staff and is about ready for publication.

3. A study of the relation between intelligence and the home language in a second generation immigrant group has been made by two members of their staff, Dr. Katharine Murdoch and Doris Maddow. The object of this investigation was to determine what relation, if any, exists between innate intelligence and the amount of English spoken in the homes of school children of foreign born parentage. Jewish girls in Grade 7A of P. S. 91, Manhattan, were the subjects.

So-called innate intelligence was measured by the International Group Mental Test, with directions given both in English and in Yiddish. The amount of English spoken in the home was measured by a scale devised for the purpose by the investigators based on the percentage of persons in the home speaking mostly English. The Otis Group Intelligence Scale and the Thorndike Word Knowledge Test were also given.

Inter-correlations of the various measures were found for separate age groups and for the whole group with age partialled out. The results indicate that the amount of English spoken in the homes of these Jewish immigrant families correlates positively with scores in the non-language test and also that it correlates about as highly with these as it does with Otis or Thorndike Word Knowledge test scores.

The conclusion drawn is that the amount of English learned by Jewish immigrant families in New York City is a factor of

their innate intelligence and that the intelligence of the children of immigrant parents in the 7th Grade in school can be measured about as fairly with standard English group intelligence tests as it can with non-language tests. An account of this study will be published in the next year book on "Studies of Genius" edited by L. S. Terman.

4. The employment records of the Vocational Service for Juniors for the past six years (1920–1926), covering between twelve and fifteen thousand applicants, are now being studied with a view to ascertaining variations in the kind and number of jobs open to young people at different ages, school accomplishments, nationality, etc., variations in wages in periods of prosperity and depression, and other factors of significance in connection with junior placement.

*Yale University*

In a recently issued report for 1925–26, Mr. A. B. Crawford, Director of the Bureau of Appointments of Yale University, comments on the development and needs of the Industrial Department of the Bureau. This department has proved distinctly helpful to graduating seniors, enabling them to make their vocational decisions on the basis of better knowledge of opportunities and sounder criteria than would otherwise be at their command. More firms than ever before sent representatives to New Haven to talk with seniors, and on every working day from early in March until June the Bureau offered its facilities to at least one, and frequently to three or four such interviewers. Mr. Crawford sounds a note of warning against the growing competition among firms for the promising graduate, which may prove quite detrimental to the young man's own best interests. He says further,

"The whole situation again points to the necessity, emphasized by the Director in previous reports, for a comprehensive plan of vocational guidance. This should include really careful analysis of each student's background, equipment, training, and inclinations, so that the placement work may become part of a scientific and broadly conceived plan of vocational advisement. Due emphasis on professional and scholarly careers should, of course, have an important part in any proper vocational program. Such an aid in orientation appears in fact one of the chief possible safeguards against the materialistic demands which to-day seem to threaten eventual depletion of certain of our oldest and most honored callings.

"The crux of the placement problem rests not in developing more opportunities, be they in professional or in business careers, for they abound already. Rather it lies in developing better methods of enabling the individual to analyze himself and choose his calling wisely, with more adequate appreciation of its demands and his qualifications therefor. That this is one of the most fundamental educational problems, upon whose solution depends the salvation of cultural values and of emphasis upon service rather than on material gain as the finest aim of education, is a conviction strengthened by each year's experience with many members of the graduating class."

The following industrial placement statistics are also taken from this report.

| *Nature of employment* | *Number of men placed* |
|---|---|
| Advertising | 3 |
| Banking and brokerage | 17 |
| Engineering | 33 |
| Insurance | 10 |
| Mercantile and office work | 24 |
| Miscellaneous | 1 |
| Production | 16 |
| Publicity | 3 |
| Sales and sales engineering | 17 |
| | 124 |

*Distribution of reported initial salaries*

| *Salary* | *Number of men* |
|---|---|
| $1,200–1,300 | 11 |
| 1,300–1,500 | 42 |
| 1,500–1,800 | 47 |
| 1,800–2,000 | 20 |
| Over 2,000 | 4 |
| | 124 |

The mean and the median of reported salaries are both approximately $1,400.

*Registration*

| | |
|---|---|
| *Registrants* | |
| College Seniors | 90 |
| Sheffield Scientific School Seniors | 105 |
| Graduate Students | 14 |
| | 209 |
| *Placements* | |
| College Seniors | 55 |
| Sheffield Scientific School Seniors | 65 |
| Graduate Students | 4 |
| | 124 |

Percentage of all industrial registrants directly placed—60 per cent.

YALE GRADUATE PLACEMENT BUREAU

Closely coöperating with the Appointment Bureau of the University is the Yale Graduate Placement Bureau, which has been organized during the past year with offices at the Yale Club, 50 Vanderbilt Avenue, New York City, with Mr. Samuel S. Board as Director. This Bureau affords opportunity for follow-up of seniors placed by the University Bureau, for graduates of any year to find openings for the best utilization of their abilities, and particularly opportunity for investigations and researches essential to development of the "scientific and broadly conceived plan of vocational advisement" mentioned in Mr. Crawford's report.

An interesting dinner conference on "The College Man in Business" was held on November 17th in New York, under the auspices of this Bureau, and in coöperation with the American Management Association. The topics and speakers follow:

"What Business Expects of a College Graduate"—Percy S. Straus, Vice-President, R. H. Macy and Company

"What the College Graduate Expects of Business"—Harry R. Wellman, Director of the Bureau of Personnel Research, Dartmouth College

"The Necessity of Better Mutual Understanding"—John Mills, formerly Personnel Director, Bell Telephone Laboratories, Inc.

"What Can Be Done About It"—James Rowland Angell, President of Yale University

Requests for reports of this meeting should be addressed to Mr. Samuel S. Board, Director, Yale Graduate Placement Bureau, 50 Vanderbilt Avenue, New York.

APPOINTMENTS AT THE UNIVERSITY OF KENTUCKY

The department of psychology at the University of Kentucky has this year added to its staff Dr. Gardner C. Basset as associate professor and James L. Graham as assistant professor. Dr. Basset, formerly at the University of Pittsburgh, will have charge of clinical work and give advanced courses in abnormal and social psychology. Prof. Graham, whose graduate work has been at Columbia and Peabody, will devote himself to the experimental laboratory courses. Prof. Paul L. Boynton will continue his interest in measurement, child development, and learning courses. Dr. Vivian E. Fisher, who was with the department last semester, has taken a position at New York University. The Kentucky department, under Dr. J. B. Miner, will be able to devote more attention to university personnel problems, a graduate assistant having been added for this work. The department has also been assigned a graduate laboratory assistant and two graduate scholarships this year.

PERSONNEL WORK IN THE COLLEGE

The *Ronald Forum* for September contains the proceedings of the eighth annual meeting of the American Association of Collegiate Schools of Business, which was held at Hanover, New Hampshire, April 29, 30, and May 1, 1926. Attention is directed to the papers on "Personnel Work in the College" by L. B. Hopkins, and "Placement of College Graduates in Business" by Paul F. Brissenden. These papers together with the discussions which are reported in full, will keenly interest administrative officers and faculty members,

not only in schools of business but throughout the colleges and universities.

### HELPING COLLEGE FRESHMEN AT WEST VIRGINIA UNIVERSITY

Individual interviews with each freshman man of West Virginia University soon after registration; filling out of freshman personnel blanks giving occupational experience, vocational preferences, honors received and activities engaged in during secondary school days; close supervision of the attendance of freshmen at classes; distribution of leaflets on occupational careers; required attendance at weekly guidance conferences and a series of special letters mimeographed and distributed at frequent intervals to the six hundred men of the first year classes, are some of the activities of Dean of Men, Harry E. Stone, in behalf of the members of the class of 1930 of West Virginia University.

These special letters have dealt with note taking, physical conditions required for effective study, formation of study habits, strengthening of memory, causes of failure in West Virginia University, meaning of college grades, taking of examinations, laws of learning, choice of a life career, time budgeting, college etiquette, and other questions of interest and value to the first year college men. Among the books from which Dean Stone has quoted in these letters to freshmen or which he has recommended to them for further reading are the following:

1. Whipple's How to Study Effectively
2. Kornhauser's How to Study
3. McMurry's How to Study
4. Kitson's How to Use Your Mind
5. Dearborn's How to Learn Easily
6. Seward's Note Taking
7. Kerfoot's How to Read
8. Sandwick's How to Study and What to Study
9. Swift's Psychology and the Day's Work
10. Stiles' The Nervous System and its Conservation
11. Dumont's Practical Memory Training
12. Adams' Making the Most of One's Mind
13. Dewey's How We Think
14. Pillsbury's Essentials of Psychology
15. Pillsbury's Attention
16. Pillsbury's The Psychology of Reasoning
17. Patrick's The Psychology of Relaxation
18. Patrick's Introduction to Philosophy
19. Lockwood's The Freshman and His College
20. Angell's Psychology
21. Wiggam's The New Decalogue of Science
22. Lyman's The Mind at Work
23. Richardson's The Choice of Books
24. Book's Learning How to Study and Work Effectively

In state universities, at least, one of the great problems of today is the salvaging of freshmen, according to Dean Stone. This is due to the fact that in many states the law requires that all graduates of first class high schools must be admitted even though their native intelligence is low and their scholastic record poor. Either greater attention to the quality of the product sent to our state universities, or more attention to freshmen after they arrive, is necessary, according to Dean Stone, if we are to change the wasteful process of wholesale elimination now too common.

### STUDIES IN PSYCHOLOGY AND PSYCHIATRY

A new series of science monographs is to appear under the title of *Studies in Psychology and Psychiatry*, edited by Edward A. Pace, Professor of Philosophy, and other members of the faculty of the Catholic University of America. These studies will be published at irregular intervals by the Williams & Wilkins Company. There will be approximately 400 pages to a volume. The subscription price is $5.00 a volume.

Of the purpose behind this new series of scientific monographs, the editor says in his prefatory note:

"Psychology and Psychiatry are so closely interrelated that it should not seem strange that a series of studies should be

published embodying the results of research in both fields.

"Many problems of Psychology are best understood by analyzing the abnormal developments that are manifested in the psychoses. This is particularly true of that field of Psychology which has to do with the emotions, impulses and desires. On the other hand the progress of Psychiatry is retarded by the present inadequacy of psychological analysis. Psychology has not as yet attained a generally accepted ultimate analysis of the elements of mental life. Consequently, it is as yet unable to give Psychiatry an outline of a scientific analytic mental examination along with methods of measurement that would clearly define the specific form and amount of degeneration present in any given case.

"It is in the hope of aiding in the development of both sciences that this series of studies has been founded. It is earnestly desired by the editors that the investigation of theoretical scientific problems in the two sciences will, by the union of these disciplines, be of practical value to humanity."

### REPORT OF INDUSTRIAL FATIGUE RESEARCH BOARD

One of the most useful little volumes for the industrial psychologist is the *Sixth Annual Report* of the *Industrial Fatigue Research Board* (London). This contains summaries and discussions of all the research work of the Board up to December 31, 1925. In this compact pamphlet one finds discussions of fatigue, distribution of output, systems of employment, atmospheric conditions and lighting, home, physical, and mental conditions, movement and time study, organization, and posture. The report is obtainable at 3 shillings from His Majesty's Stationery Office, London.

### MITTEN EMPLOYE STOCK OWNERSHIP PLAN

Employe ownership is no longer an experiment, according to Thomas E. Mitten of Philadelphia, who recently addressed the Congress of American Industry held at the Sesquicentennial. Mr. Mitten regards such ownership as the only means by which industry can be reared on a sound foundation and made strike-proof. His remarks caused a good deal of discussion and prompted the *New York Times* to ask that his views be developed.

The following paragraphs are quoted from this interview, which was published in the *Times* of November 7th:

As a young man Mr. Mitten became interested in traction problems. In 1896, in Milwaukee, he was in the midst of a bitter strike, lost by the men. Stirred by their suffering and by the inconvenience the strike caused, he sought a means of bringing owners and men into a closer relationship. Again, in Chicago, where he headed the traction interests, he found himself confronted with similar problems, and endeavored for the first time to obtain a higher rate of production through coöperation—only to be told by the men: "What's the use? Capital gets all the gain."

In the almost ruined street railway system of Philadelphia Mr. Mitten saw an opportunity to try out his theories. Conditions could not have been worse. The company was losing money, the men were demoralized and the equipment was going to pieces.

Called by a group of bankers, in 1911, to take over the management of this company, he immediately made a direct appeal to the employes offering them, for their coöperation in bringing about increased production, the right to participate in the profits.

The company agreed to give the men in wages 22 cents out of every dollar received on the system. The war came. Prices soared. A decision was reached between Mr. Mitten and his men that the wage paid them should be based on a four-city average. The 5-cent fare could not stand the the strain of the increase, and Philadelphia in a few years found itself facing a new dilemma.

The management did not approve of raising the rate and urged the men to bear with it. For a time it seemed that the company would not be able to finance itself. At this point Mr. Mitten received proof of the loyalty of his men. They came for-

ward with the offer of $1,000,000, held in their savings fund, and placed it at his disposal.

The Board of Directors of the Philadelphia Rapid Transit disagreed with Mr. Mitten's fare and wage policies, and opposed them before the stockholders. The action of the board spelled its own doom—not that of Mr. Mitten, his management and men. With the aid of his employes he obtained an overwhelming number of proxies and was enabled to nominate a new board, made up of men who were active in the practical operation of the road. Among them was John McElroy, former laborer for the company and President of the Employe's Coöperative Welfare Association. Having thus gained control of the corporation, with the employes behind him, Mr. Mitten could go ahead with his scheme.

The coöperation of the men, the improved service to the public, the decrease in cost of operation plus increased earnings made it possible to organize a system whereby a wage dividend equal to 10 per cent of the payroll could be given to the employes. Within the past five years they have bought enough stock to give them considerable control over the company for which they work. It was done under a plan whereby a part of their wage, instead of being paid in cash, was by common consent turned over to a coöperative wage fund used by them through their trustees for the purchase of stock.

Today the men actually own more than 220,000 out of a total of 600,000 shares. This pays them almost $900,000 annually in dividends. Their vast block of voting stock, valued at $12,000,000, administered by trustees appointed by the employes, held by a body of men thinking practically as one mind, may well be said to give them control of the company for which they work.

*Where the unions stand*

The first question that arises in the mind of the outsider, newly initiated in the Mitten plan, is: What of the unions? Can and will organized labor work under an employe ownership plan?

The question was put to Mr. Mitten, and his answer was direct: "Certainly, the plan would be beneficial and strengthening to the unions. If the brotherhoods of the railroads undertook to secure the economic results attainable by such means they would become immensely stronger. In fact, our plan was designed to be worked in conjunction with the unions in Philadelphia in 1911. It was agreed to by the city railway unions and would have been made effective with them had they been able to obtain the votes necessary to put it through."

Reviewing his work in Philadelphia, Mr. Mitten related that he was confronted not with one union but with three unions when he took over the management of the city railways, and that, the unions being unable to agree among themselves, the men took matters into their own hands, abandoned their organizations and by a two-thirds vote accepted his proposition.

"I have never been opposed to unions, and give them all the credit they deserve for what they have done in the past. We need organized labor to balance organized capital. But let organized labor keep abreast of the times. Today labor must organize for economic accomplishment—not to destroy the machinery of industry, but to make it more efficient.

"Next you will ask about strikes," he said. "Employe ownership makes industry strike-proof. A man does not destroy his own property; the capitalist's interests become the worker's interests. The cooperative wage, based on the economic result in excess of that needed to pay the return to capital and involved in the property, would make strikes an impossibility."

The same principle that applies to walkouts applies to labor turnover, Mr. Mitten asserts. It is reduced to practically nothing. The investor who sees his investment accumulating, and who is paid a good return on his money, holds to it, and in like manner the worker would be loath to renounce the job that brings him good results.

CHILD LABOR AND THE SCHOOLS

That the National Association of Manufacturers is opening the way for a campaign to deprive a large number of Amercan

children of the benefits of the public schools is the answer of the National Child Labor Committee to the report of the Committee in Junior Education and Employment of the Manufacturers Association, which advocates that children should be allowed to leave school and go to work at 14, claiming that this is the conclusion of modern educational research.

The National Child Labor Committee asserts that, on the contrary, recent scientific investigations justify the position they have always taken that children should remain in school until 16. In support of this view, they quote Mrs. Helen Thompson Woolley, Ph.D., formerly Director of the Vocation Bureau of Cincinnati and at present Director of the Institute of Child Welfare Research, Teachers College, Columbia University, whose recent book "An Experimental Study of Children," is the chief source on which the National Association of Manufacturers base their report.

In a personal interview with a representative of the National Child Labor Committee, Mrs. Woolley stated that she does not share the view of the National Association of Manufacturers, which seems to advocate a 14 year age limit for compulsory school attendance. "Although recent educational studies and our growing knowledge regarding differences in mental ability have revised my former attitude with respect to many of the problems of the child who leaves school for work, I have not altered my fundamental belief that children should continue their education until they have reached the age of 16.

"It is true that the majority of children who leave school under 16 are the mentally inferior group, and failure in school is a more compelling motive than economic pressure in sending them into industry. But the conclusion to which this points is that our school system must be re-organized, not that these children should be allowed to work. If the school as at present constituted has nothing to offer this large group of children between 14 and 16 who cannot profit by the usual academic work, then it must introduce a new type of education that will give them something of value. Inferior children mature later than do normal and superior children, and it is doubly important to protect them from undue strain and responsibilities during this period of their most rapid physical and mental growth. No educator really believes that allowing the inferior children to leave school, after the required number of years of academic failure, is a good educational policy. It has been allowed to go on merely because the school has not known how to meet the situation.

"The report of the National Association of Manufacturers also seems to suggest that I do not regard employment as physically harmful for children under 16," continued Mrs. Woolley. "It must be remembered, however, that my study, which showed little correlation between physical abilities and employment, was based on the city of Cincinnati alone, where for years there has been a very strict child labor law, rigidly enforced, which controlled the conditions under which children worked. There was also in Cincinnati, when this group of working children left school, a comprehensive system of school medical inspection and before entering employment children were required to have a physical examination and secure a certificate of physical fitness. These were important factors in determining the relatively satisfactory physical showing of these children during the years of their employment. Furthermore, as stated in the study, the results seemed to indicate that school life favors general physical vigor and energy more than working life."

With one other assumption of the report of the National Association of Manufacturers, Mrs. Woolley takes issue, namely, that since staying in school does not seem to mean higher wages, it therefore follows that this group of retarded children, who ultimately go into routine factory work, gain nothing by remaining in school. "This is a limited view of the function of education," she says. "It would be more correct to say that because of the very fact that these children are destined for routine factory work and will probably never reënter school, it is more important

that they continue their education. I do not mean vocational training. As a matter of fact the simple processes of routine jobs can be learned in a few weeks in the factory more satisfactorily than in a schoolroom, even a vocational workshop. But I do mean a type of education that will give them a right attitude toward and interest in their job and that will enable them to enjoy the leisure hours not occupied by the drudgery of earning a living.

"The manufacturers regard the child primarily as a wage-earning unit. To the educator he is very much more than that. His ability to earn a living is but a small part of his preparation for life and one that for children of limited mental capacity requires little or no training. It is ability to live harmonously, to be a good member of a family, to take his enjoyment wholesomely, to contribute to community progress, that requires the training. Herein lies the real function of education. If education has failed up to this time to accomplish this result for some group the remedy is not in doing away with education. It is in making it more efficient.

"One thing is obvious. With this new and individualized education that seeks to adapt the school program to the varied capacities of school children, the task of education will become more complex, and its cost will become greater. As far as the child destined for work is concerned, it implies a longer period of supervision and coöperation on the part of the school before the young worker is thrown completely on his own resources."

### A NELECTED FIELD OF PERSONNEL RESEARCH

"Waste in industry arising from unnecessary fatigue is a new problem in industry," says Nelle Swartz, director of the Bureau of Women in Industry, writing in the bulletin of the State Department of Labor.

"As industrial processes change, as larger and more complicated machines take the place of hand labor, as increased production means greater and greater speed, there are certain elements which enter into the question of fatigue which need not have been considered ten years ago. One of these factors is vibration. While there has been some discussion of the effect of vibration on human beings, it has received relatively little consideration. Vibration, in fact, has received much less attention than any of the other recognized causes of non-muscular fatigue.

"Workers who sit all day on a floor which is constantly vibrating from the speed of machines may get 'used to it,' and they may be scarcely or not at all conscious of any increased effort necessitated by vibration, but the very process of getting 'used to it' involves an increased intensity of nervous effort which in itself is fatiguing.

"Many employers dismiss vibration as a cause of fatigue with the testimony of the worker himself when he says that he does not notice it and gets 'used to it.' This is not reliable. Wundt, in his laboratory experiments, finds that the process of getting 'used to anything' involves increased intensity of nervous effort, and 'a feeling of being coerced,' which is most favorable for the approach of exhaustion." —*American Federation of Labor Weekly News Service.*

### PRESTIGE VALUE OF PUBLIC AND PRIVATE EMPLOYMENT IN CHICAGO

One of the points stressed in Prof. L. D. White's study of conditions of municipal employment in Chicago was the lack of any feeling of prestige centering about public employment as such or in comparison with private employment. It was suggested in the study that public employment ought to create and capitalize for the benefit of the service the honor and social prestige which may be attached to service of the State or its sub-divisions. Prof. White is to make a detailed exploration of the state of public opinion in Chicago with reference to public as compared with similar private employments. The methods used will involve the personal interview on a large scale based on (1) choices between the items of twenty paired groups illustrating different occupations, public and private, (2) choices between a series of statements arranged from expressions of high approval to expressions of high disapproval of public employment, (3) special studies of

the state of opinion with regard to selected employments such as police and fire department, for which no analogous employment is found in private circles, and (4) laboratory study of responses to certain type stimuli. These choices and responses will be correlated with such factors as age, sex, race, length of residence in Chicago, income, and other items. The study will be conducted throughout the present academic year.

### A CONFERENCE OF PERSONNEL MANAGERS AND COLLEGE PLACEMENT OFFICERS

Problems of common interest to personnel managers in business and industry, and to placement officers in colleges, universities, business schools, and employment bureaus, will be discussed at a conference to be held at the Hotel Pennsylvania in New York on Thursday, Friday, and Saturday, January 20, 21, and 22, 1927.

This conference is being held under the joint auspices of the Personnel Research Federation, the National Association of Appointment Secretaries, and the National Committee of Bureaus of Occupations.

Special opportunity will be afforded for the employment representatives of business and industrial firms and the placement officers of colleges and universities to become better acquainted with each other. Much must be done to improve the process of placing college graduates in business, and practical suggestions for the next steps to be taken should result from this conference. At every session, emphasis will be placed on research, and on means of coöperation both between the colleges and business and among the college placement bureaus.

The conference is open to all persons interested. The tentative program follows.

*Program (preliminary announcement)*

**Thursday, January 20**

*9:30 a.m.*

Registration, Business Meetings, Appointment of Committees.

*2:30 p.m.*

Presentation and Discussion of the Report on Personnel Procedure, made by L. B. Hopkins for the Intercollegiate Council on Personnel Methods. C. R. Mann, Director, American Council on Education, Presiding.

1. High Spots of the Report—Dean H. E. Hawkes, Columbia University.
2. Implications for Industry—W. V. Bingham, Personnel Research Federation.
3. Discussion: W. A. Frayer, University of Michigan, H. B. Hastings, Yale University; V. Lansing Collins, Princeton University.

*7:30 p.m.*

Reception and Smoker with speaking commenting at 8:00. General Topic: "Mental Hygiene." C. Floyd Haviland, M.D., Superintendent, Manhattan State Hospital, Presiding.

1. In the Colleges—A. R. Ruggles, M.D., Consultant in Mental Hygiene, Yale University.
2. In Business and Industry—V. V. Anderson, M.D., R.H. Macy and Company.
3. In Vocational Guidance and Placement—H. M. Tiedbout, M.D., Philadelphia Demonstration Clinic, National Committee for Mental Hygiene.
4. Discussion.

*Friday, January 21*

*9:30 a.m.*

Double Session.

Section A. General Topic: "Employment Tests." J. McKeen Cattell, President, Psychological Corporation, Presiding.

1. In the Factory—Johnson O'Connor, General Electric Company; M. S. Viteles, University of Pennsylvania.
2. In the Office—F. K. Daniels, Aetna Life Insurance Company, Marion A. Bills, Aetna Life Insurance Company.
3. In Training Courses for College Gradu-

ates—O. W. ESHBACH, American Telephone and Telegraph Company.
4. Summary of Recent Research, and Discussion—A. T. POFFENBERGER, Columbia University.

Section B. General Topic: "Placement of Teachers." MARGARET CAMERON, President, National Association of Appointment Secretaties, Presiding.
1. Adequate Handling of the Active List —ISABELLE PRATT, Teachers College, Columbia University.
2. Methods of Checking Acceptance of Positions—ELIZABETH SNELL, Stanford University.
3. (Topic to be announced.)

*12:30 p.m.*

Informal Luncheon Meeting, Employment Representatives and College Placement Officers.

*2:30 p.m.*

General Topic: "Placing College Graduates in Business." D. S. BRIDGMAN, American Telephone and Telegraph Company, Presiding.
1. The Rôle of the College—DEAN A. A. POTTER, Purdue University; G. E. BATES, Harvard Graduate School of Business; A. B. CRAWFORD, Yale University; C. E. CLEWELL, University of Pennsylvania.
2. The Rôle of the Employer—E. B. ROBERTS, Westinghouse Electric and Manufacturing Company; C. R. DOOLEY, Standard Oil Company of New Jersey; H. E. VON KERSBURG, R. H. Macy and Company.
3. Summary of Recent Research, and Discussion—R. I. REES, American Telephone and Telegraph Company.

*6:30 p.m.*

Dinner Meeting with speaking commencing at 8:00. General Topic: "The Personal Interview." MARY TOLMAN, President, National Committee of Bureaus of Occupations, Presiding.
1. From the Standpoint of Guidance—DOUGLAS FRYER, New York University.
2. From the Standpoint of Placement—MARY H. S. HAYES, Vocational Service for Juniors.
3. From the Standpoint of Employment —JOHN MILLS, Bell Telephone Laboratories, Inc.
4. From the Standpoint of Research—DEAN F. F. BRADSHAW, University of North Carolina.

*Saturday, January 22*

*9:30 a.m.*

Committee Reports and Business Meetings.

*11:00 a.m.*

Opportunity to visit institutions and offices of organizations in New York.

All persons interested are invited to attend the sessions of this conference. The evening sessions will not require formal dress. Dinner tickets are $3.50. The conference registration fee for non-members of convening associations in $1.00, admitting to all sessions.

Program committee: Margaret Cameron, *Chairman*; D. A. Bridgman, C. R. Mann, Mary Tolman, P. W. Viets, and C. S. Yoakum.

For further information and final program, address *Miss Margaret Cameron, President, National Association of Appointment Secretaries, University of Michigan, Ann Arbor, Michigan.*

# A Mechanical Ability Test

By T. W. MacQuarrie, *University of Southern California*

*In measuring mechanical ability investigators have almost invariably been influenced by brass instrument psychology and the tools of the workshop. While the usefulness of these mechanical contrivances is being proved, investigators are realizing that they are costly, ineffective in testing groups, and difficult to standardize. If Dr. MacQuarrie's simple paper and pencil test of mechanical aptitude fulfills the promise of the preliminary trial here reported, we shall have a novel and useful addition to the tools of vocational guidance and selection.*

The author describes a paper and pencil performance test for mechanical ability.

The test consists of seven parts printed together in a booklet. The reliabilities of the separate parts are as follows: Tracing 0.80, tapping 0.85, dotting 0.74, copying 0.86, location 0.72, blocks 0.80, and pursuit 0.76. The reliability of the whole test was found to be over 0.90 with each of three groups of subjects, numbering 35, 80, and 250 cases.

The test measures something other than mental alertness, since it correlates less than 0.20 with a group mental test.

When test scores were compared with teacher ratings on mechanical ability, the correlation was in no case over 0.48. But different results were obtained when test scores were compared with ratings on mechanical work the students turned out. In two such studies in which most of the raters did not know who did the work they were rating, correlations of 0.81 were found, while in another study the correlation was 0.32.

A MECHANIC is judged by the work he does. The foreman has little interest in the original ideas of his men, or in their suggestions for changes in shop procedures. What he wants is the largest possible production of standard results. He judges his candidate by the way he does his work, by his speed in getting it done, and by the quality of the product. Since the ability of the mechanic is measured by his performance, a test for mechanical ability should be a performance test.

The place for a mechanical ability test is in the selection of candidates for training as mechanics, or in the vocational guidance of young people who are undecided as to their plans. It must be adapted to schools, as well as to industrial use. It must be short, fitting into the ordinary school period, and it must be adapted to school room equipment. The test must be cheap.

It must be handy, easy to give and to score.

The test must be general, not limited by age, sex, environment, or occupation. In spite of certain studies which seem to show that there is no general mechanical ability, there are very few mechanics who believe that work in one craft is different from that in any other. Most real mechanics feel that they could have learned any other mechanical trade just as easily as the one they selected, and, as a matter of fact, are proficient in two or more lines, and keep employed in one as well as in another.

### A PAPER PERFORMANCE TEST

The problem presented, then, to one who would measure mechanical ability is to find a test situation that can be accepted as a fair sample of mechanical work in general. In this case the attempt has been made to get up such a test in paper, one that requires for its single tool a lead pencil, and for its bench a school desk. To such apparatus the boy needs no introduction.

The limitations of paper and pencil preclude any attempt to simulate actual trade processes, but in this instance an effort has been made to duplicate in paper a number of tests of the psychological laboratory that have been used at various times to measure mechanical ability. In all, some thirty tests, ranging from simple tapping tests to elaborate puzzles, were selected for consideration. In each case an attempt was made to devise a paper form that would present the same stimuli as the laboratory test.

The first test battery consisted of twenty-four parts and a tryout was conducted for the purpose of eliminating those evidently unfit. All that showed a reliability of less than 0.70, when given twice to the same subjects, were discarded. This reduced the number to twelve. A more careful study was made with the next printing to determine validity as well as reliability, and that, on a later printing, reduced the number to the seven parts now used.

It is rather easy to develop a part that has reliability and validity, but the practicability of the part is what usually determines its use. Some parts took too much time, some required long explanations, some were not adapted to girls as well as boys, and several were found that were almost alike. In two cases, parts were dropped for the simple reason that stencils were required for scoring, and finally, one part was dropped because there was no room for it in an eight-page booklet.

At the outset, it was determined to devise a test of performance and not of ability to understand directions. To insure this, each part was provided with a practice exercise that the subject might become well acquainted with its nature. Possibly, if a test for inventors or artists instead of mechanics had been contemplated, no such practice exercises would have been included. The problem of this study was to present a situation that would require mechanical performance, and not the alert comprehension of complicated directions.

For these reasons, the objective of testing for mechanical ability has been

kept constantly in mind. Practical requirements have been given serious consideration, and the test, as it stands now, is the result of a series of compromises between statistical results and practical demands. To make the operations clear, a set of parts which have been partially filled out are reproduced with this article.

### TRACING

The first part of the test, shown in figure 1, developed from the common laboratory tracing test. Converging lines were first tried, but it was found very difficult to score the errors, since they varied in degree. One might make a contact of a mere dot, or one of half an inch. Certainly these contacts were not of equal value. In an attempt to make the scoring more nearly objective the present form was developed. Here the subject is asked to start his pencil line at the little triangle, and draw through the openings in the vertical lines, right and left, until time is called. The score is the number of openings through which the line passes without touching.

The width of the line is important, but that problem has been met by requiring that a No. 2 lead pencil be provided, and that it be sharpened in a common pencil sharpener, at both ends, each time before using. In no other form in the test is the quality of the line important, so this one was put first to have the advantage of the newly sharpened pencils.

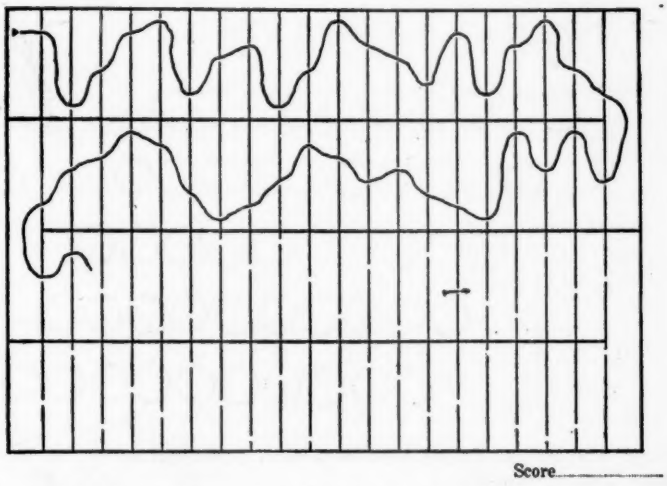


FIG. 1. Directions: Draw a line through the openings without touching.
Time: Fifty seconds.
Score: Number of openings passed through without touching.

On several occasions this part has shown a reliability of over 0.80, when given to the same subjects a second time.

### TAPPING

So many of the attempts made in industrial concerns to measure native mechanical ability have included tapping tests that it was thought advisable to include one in the present

test. In order to make it possible to count the taps readily, the form shown in figure 2 was devised. The subject is required to put three pencil dots in each circle as fast as he can. Other elements, not included in the usual tapping test, enter here. No doubt there is some measure of one's sense of rhythm. Strength seems to be a factor also, and the adjustment to new lines presents situations not found in the laboratory test.

entirely within the circles. The exact number of dots is required, but the number of circles attacked correlates almost perfectly with the number of dots, and scoring may be done by merely counting the circles attacked. The part as now used has a reliability of about 0.85.

DOTTING

The dotting test, as shown in figure 3, is a development of the laboratory

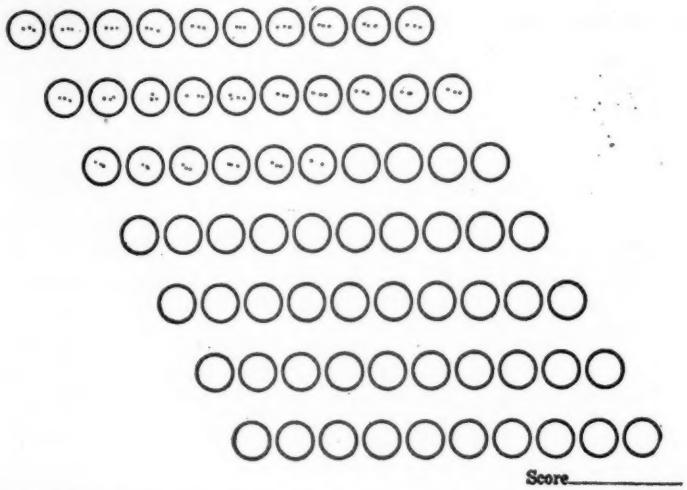


FIG. 2. Directions: Put three dots in each circle just as fast as possible.
Time: Thirty seconds.
Score: Number of dots divided by three.

A short study was made of the number of taps to require in each circle. Tryouts were conducted with five, four, three and two. It was found that three constituted the most desirable number, as it was sufficient to keep the hand busy, and not too many to cause a great variability in the number made by any individual.

In this part, too much stress is not put on scoring for accuracy. No penalty is exacted if taps are not

aiming test. A number of forms were tried out in this connection. First, a line of targets was provided, and the subjects were asked to strike them with their pencils, in unison, all raising their pencils each time as high as the forehead. Scoring was by means of stencils. This form did not prove satisfactory either in the giving or the scoring, although it had a fair reliability and was interesting. A number of other trials were made, and

the present form was finally developed. Now the subject is required to put one dot in each circle just as fast as he can, following the string. Each dot must be clearly within the circle, as this is a matter of accuracy rather than motility. The variation in the distances between the circles, and the requirement that the hand must move to the right and left, presented situations that made this part quite different from the *tapping* part. This part has a reliability of about 0.74.

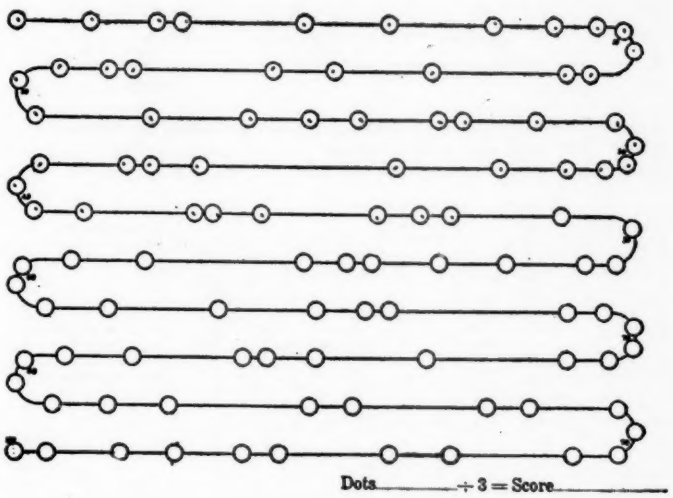


Fig. 3. Directions: Put one dot in each circle as fast as you can.
Time: Thirty seconds.
Score: Number of dots divided by three.

### COPYING

The copying test, shown in figure 4, represents an interesting development. The subjects were first asked to copy certain figures on clear paper, and of course the scoring was next to impossible. By submitting a very simple figure of four straight lines, and then indicating by means of dots possible terminal points for the lines, the requirements became much more definite and the scoring highly reliable. At first this part was called *length and direction*, since the subject is required to determine and indicate merely the length and direction of each line. The lines do not need to be straight, nor do they need to touch the terminal dots. Any clear indication of the correct line counts in the score. An error in one line does not carry over to the next one, as length and direction only and not location are the controlling factors. This part has a reliability of about 0.86.

### LOCATION

The location part, as shown in figure 5, is a development of certain common tests for space relations. Each small square represents the large one, and the dots represent the corresponding

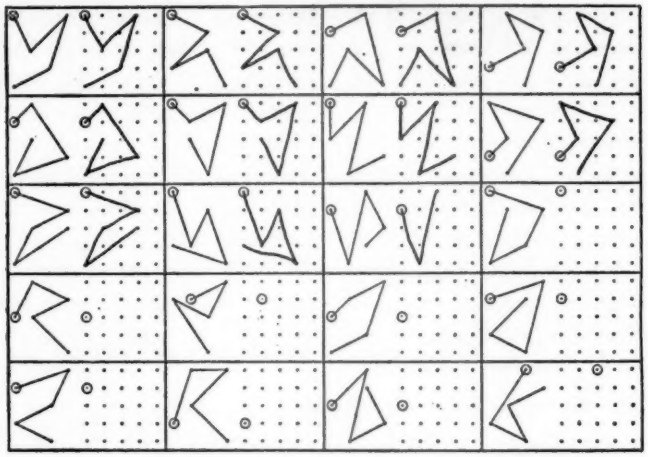


Fig. 4. Directions: Copy each figure in the dots at the right of it.
Time: Two and one-half minutes.
Score: Number of correct lines made.

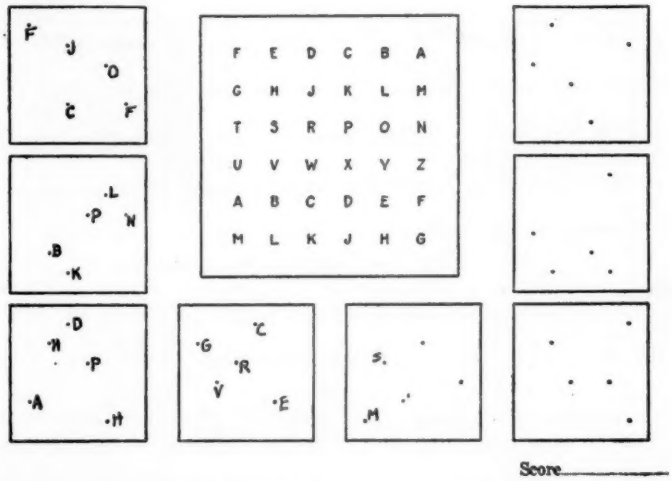


Fig. 5. Directions: Letter each dot in the small squares with the corresponding letter in the large square.
Time: Two minutes.
Score: Number of correct dots.

letters. The subject is required to letter each dot, and the score is the total he has correct. It is an easy part to give and score, and has a reliability of about 0.72.

BLOCKS

Possibly a better name could have been selected for the test shown in figure 6, but after many names had been considered for various parts in

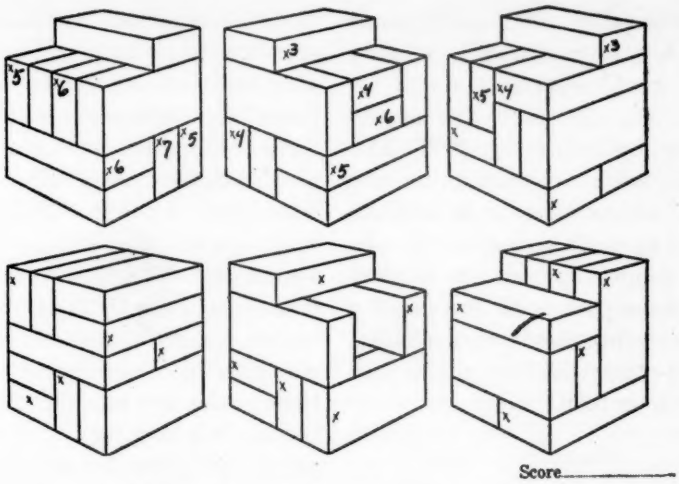


FIG. 6. Directions: Count the blocks that touch each X-block and record the number.
Time: Two and one-half minutes.
Score: Number of correct records.

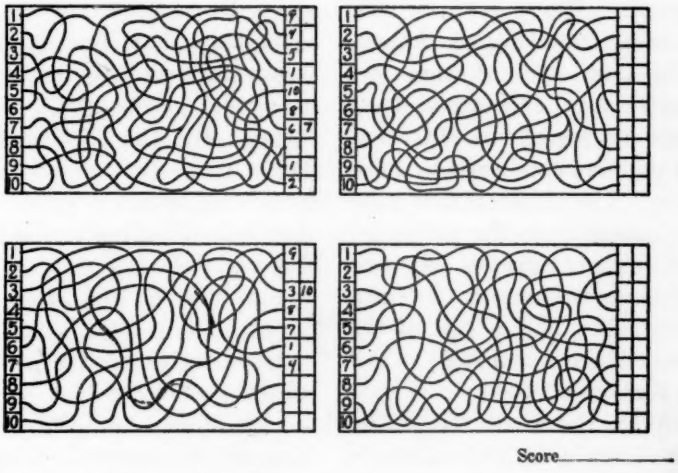


FIG. 7. Directions: Follow each line by eye, and put on the end the number it has at the beginning.
Time: Two and one-half minutes.
Score: Number of correct answers.
Total score for the test: Sum of form scores divided by three.

the test, most of them in psychological terms, it was decided that the simpler the names the less would be required in the way of explanation and vindication. So this one ceased to be *spatial perception*, and became simply *blocks*.

Many tests have included parts like the one shown here, but most of them have required the total number

as a single response. One might count many blocks correctly but, missing only one, would receive no credit for the work. In this part, five of the blocks are indicated by X's. The subject is asked to determine the number of blocks that touch each X-block, and to record it on the X. In that way more responses are secured from the same part, with less penalty for error, and the score is more reliable. In this case the reliability of the part is slightly over 0.80.

### PURSUIT

The part shown in figure 7 is a development from the Miles Water Pendulum Test. This part was developed in an attempt to duplicate that test on paper. There is little similarity between the two, as muscular coördination and rhythm are entirely left out. Objections have been raised in regard to this part because it requires good eyes to make a high score. The answer is that good eyes are a necessity to the mechanic. The mere use of glasses is considered by many workmen a handicap in getting a job. This is one of the easiest parts to give and score. The reliability is about 0.76.

The score for the whole test is the sum of the scores in the separate parts divided by three.

### RELIABILITY OF THE WHOLE TEST

In attempting to determine the reliability of the whole test, due consideration was given to the controversies that have developed over *same* and *similar* parts. The test has been criticized because two or more forms were not provided. This is not a mental test, where acquaintance with the form is an advantage, but a performance test where the subject has been fully instructed as to its nature before the record is taken. One does not check the reliability of a performance test in the laboratory by making a so-called similar form of the apparatus. The way to check a performance test is by more performance under the same conditions. A thorough understanding of the directions in this test is required before any record form is given. If there is any advantage for a second test, it means that the preliminary parts have not functioned properly.

The reliability of the test was determined a number of times by giving it twice to the same individuals. Sometimes there was as much as six weeks between the trials. In three cases with groups of 35, 80, and 250, respectively, the coefficient was over 0.90. While that would generally be considered satisfactory, it is realized that it is still possible for a considerable variability to express itself in the case of any one individual. For that reason, if important decisions are at stake, re-tests should be given and the reliability checked.

As it stands now this test may be taken by girls as well as boys without any handicap. Several studies have been made and in all of them the mean scores and standard deviations of the sexes have been very nearly the same.

A number of studies have been made to determine the correlation with group mental test scores. These have never gone above 0.20 and in one group of sixty cases the correlation was 0.002. Whatever this test measures

then, it is quite certain that it is something different from the traits measured by group mental tests.

Some criticisms have been leveled at the general requirement for speed in this test. This condition is largely the result of the desire to make the test short and simple, and could hardly be avoided. It may be stated, nevertheless, that speed is a most important factor in the success of a mechanic. The slow, plodding, serious worker may inspire our interest, but he is more likely to be out of a job in this day and age than the man who can work fast.

## VALIDITY

An attempt was made to see if this test indicated the presence of mechanical ability. One may ask a teacher of mechanical work if he can tell whether a boy is mechanical, and receive a hearty affirmative. But when that teacher is asked to rate his students in order he is usually at a loss with all but the most outstanding individuals. Most of the teacher ratings of mechanical ability have very low reliability. In one case in this study the reliability of the estimates was less than 0.40. It is certainly most difficult to validate a measure of something we cannot define and cannot rate with any degree of accuracy.

Several studies were made to determine the validity of this battery as a test of mechanical ability by means of these teacher ratings. In no case did the coefficient go over 0.48. After a number of such experiences, it was thought best to have the students do some mechanical work, and have them rated on the projects. In this way personality was eliminated. The rating of the projects was usually done by persons who did not know the individuals who performed the work, and the coefficients obtained were, in general, much higher. In two careful studies they reached 0.81, while in one of the groups the correlation was 0.32.

The validity of a test does not always depend upon statistical studies. In everyday affairs one's judgments are often based upon a general impression. In this connection it is worth while to note that teachers of shop work and other mechanical subjects expressed considerable enthusiasm over the test. It appealed to them as demanding the sort of ability that a shop project required. It seemed to them to be a mechanical job. Many were asked for their opinions and with few exceptions they thought it measured mechanical ability, certainly as well as any project in a shop.

A fairly well established mean on this test, when given to boys and girls of high school age, of the proper age to begin learning a trade, is 63, with a standard deviation of 12. A score of 75 might well be considered high, and a counselor would be justified in advising the consideration of other than a mechanical calling for anyone who makes a score much less than that. It would be quite possible for schools and colleges giving training in mechanical lines to determine norms of their own, by a study of their local conditions, and that should prove one of the most interesting further developments of this test.

(*Manuscript received October 22, 1926*)

# A Comparison of Raters

By Arthur W. Kornhauser, *University of Chicago*

*Dr. Kornhauser, in continuing the series of articles begun in the September issue, gives another set of data from the extensive rating scale investigations which he has made. He compares the judgments of different raters, and brings out the significance of observed agreements and differences in making an estimate of the value of the rating system. He concludes that it is unwise to make a hasty condemnation of a rating system because raters have been found to disagree, for these differences may reflect actual differences in the behavior or attitude of the persons rated.*

College instructors who rated two groups of students with a graphic rating scale for seven traits are compared with regard to their rating tendencies or standards, and their agreement in relative standing assigned to individual students. Wide divergence is found in averages of ratings of instructors. Correlations of ratings made by pairs of raters show considerable divergence, the average correlation being 0.41 for one group of students and 0.38 for the other. Correlations between ratings by the same instructor at different times average 0.60.

RATERS never agree perfectly in their estimates of other people. Hence each person judged receives a variety of ratings. The nature and extent of these variations are important both in interpreting the judgments received by individuals, and in evaluating the rating procedure as a whole.

The practical need for studying the differences among raters may be simply illustrated. In trustworthiness Mr. A is rated say, 8 (on a scale from 1 to 10) by rater X. Mr. B is rated 6 by judge Y. It appears from this that A is more trustworthy than B. But suppose we find, on investigation, that rater X gave almost everyone either 9 or 10, while Y placed most of his ratings at 4 and 5. Our judgment about A and B is then completely reversed. Another type of example is this: Mr. M receives four ratings of 1 or 2 in industriousness; Mr. N has about the same ratings. However, the four judges who rated M are found to agree very closely with one another in all their ratings, while the four who judged N show almost no agreement among themselves. The unanimity concerning N then becomes much more striking since it occurs among raters who are not, in general, like-minded.

If the ratings by several judges, instead of being used separately, are averaged to give each individual a

composite rating, the interpretation of that average is still dependent upon the relations of the separate ratings on which it is based. Marked variations in standards from rater to rater will decrease the reliability of the average ratings, as will also the disagreements among raters in the relative standing assigned to the individuals rated.

The comparison of ratings by different raters, in addition to being useful in these practical interpretations of estimates, also tells something of how well the rating procedure is working, and suggests where certain improvements are needed. To the extent that great discrepancies in rating standards are present, there is evidently need for corrective methods—by instruction of the raters, by changes in the scale, or by statistical devices. Extreme disagreement in the relative standing of the people rated is likewise an indication that something is wrong—usually that the judges do not know the men rated well enough or that they do not have the same conceptions of the traits they are rating.

## THE PRESENT DATA AND PROBLEM

This paper contains some comparisons of ratings given by different college instructors who were rating students by means of a graphic rating scale containing seven traits. The scale has been described in an earlier paper.[1] The rating procedure was probably no better or worse than usual where a large number of estimates are secured periodically. Two sets of data are used—ratings of a group of graduating seniors (to be called Group A) and ratings of a general undergraduate group (Group B). In Group A, the instructors rated only those students whom they knew fairly well; in Group B they rated some students who were less well known.

Our statistical study of the agreement among raters is conveniently divided into two parts, suggested by the following questions: (1) How well do the instructors agree in their rating tendencies or standards? (2) How well do they agree in the relative standing assigned to individual students?

Differences in rating standards are brought out in tables 1 to 4 inclusive. The tables may be read as follows: In the intelligence ratings of Group A, most instructors' ratings average about 6.5 or 7, but one goes as high as 8 and one goes as low as 5 (table 1). Similarly with respect to the spread of ratings, table 3 shows that in intelligence most instructors scatter their estimates to the extent represented by an average deviation of 1.1 to 1.6, but one goes as low as 0.7 and one as high as 1.9.

The extent of the differences in rating tendencies is represented in the final columns of the tables. The greater these average deviations, the more marked are the discrepancies or differences among the instructors. According to this index, the agreement among raters was slighly closer in Group B than in Group A. This is noteworthy in view of the fact that students in Group A were more reliably differentiated than were those of Group B, when combined ratings of

[1] Arthur W. Kornhauser: Reliability of Average Ratings. Journal of Personnel Research, December, 1926.

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several judges were used.[2] Apparently the superiority of the composite ratings in Group A is not ascribable to better agreement in rating standards. In both groups, however, the differences in standards are certainly great enough to point to the possibility of course, reflect actual differences among the students rated rather than differences in rating standards. Further inquiry has made this seem untenable as the principal interpretation, however, though it is probably one factor in the results. A few considerations

TABLE 1

*Distributions of the average ratings given by each of 15 instructors who rated 12 or more students in Group A*

| TRAITS | AVERAGE RATINGS* | | | | | | | | | | | AVERAGE OF AVERAGE RATINGS | A.D. OF AVERAGE RATINGS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4.5 | 5 | 5.5 | 6 | 6.5 | 7 | 7.5 | 8 | 8.5 | 9 | 9.5 | 10 | | |
| Intelligence | | 1 | | 1 | 6 | 6 | | 1 | | | | | 6.7 | 0.45 |
| Industry | | 1 | | 1 | 1 | 4 | 7 | | 1 | | | | 7.1 | 0.56 |
| Accuracy | 1 | | 1 | 5 | 7 | 1 | | | | | | | 6.2 | 0.42 |
| Coöperativeness | | 1 | | 1 | 3 | 1 | 3 | 5 | 1 | | | | 7.2 | 0.79 |
| Initiative | | 1 | 2 | 3 | 4 | 4 | 1 | | | | | | 6.4 | 0.55 |
| Moral Trustworthiness | | | | | 2 | 1 | 2 | 3 | 4 | 1 | | 1 | 8.0 | 0.71 |
| Leadership Ability | | | 3 | 3 | 2 | 4 | 2 | 1 | | | | | 6.6 | 0.67 |

* To the nearest half unit.

TABLE 2

*Distributions of the average ratings given by each of 41 instructors who rated 15 or more students in Group B*

| TRAITS | AVERAGE RATINGS* | | | | | | | | | | | AVERAGE OF AVERAGE RATINGS | A.D. OF AVERAGE RATINGS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | 4.5 | 5 | 5.5 | 6 | 6.5 | 7 | 7.5 | 8 | 8.5 | 9 | 9.5 | | |
| Intelligence | | 1 | | 3 | 8 | 15 | 11 | 3 | | | | | 6.5 | 0.43 |
| Industry | 1 | | | 2 | 9 | 10 | 14 | 4 | 1 | | | | 6.6 | 0.54 |
| Accuracy | 1 | 1 | 3 | 9 | 12 | 6 | 7 | 1 | 1 | | | | 6.1 | 0.62 |
| Coöperativeness | | | 1 | 2 | 7 | 9 | 10 | 5 | 6 | 1 | | | 6.8 | 0.66 |
| Initiative | 1 | | | 7 | 16 | 9 | 7 | 1 | | | | | 6.2 | 0.49 |
| Moral Trustworthiness | | | 1 | | 4 | 5 | 9 | 10 | 7 | 4 | | 1 | 7.3 | 0.69 |
| Leadership Ability | 1 | | 1 | 6 | 17 | 11 | 4 | 1 | | | | | 6.1 | 0.44 |

* To the nearest half unit.

improving the rating results through methods which will reduce the variations from instructor to instructor.

The differences in ratings which have just been discussed could, of course, reflect actual differences among the students rated rather than differences in rating standards. Further inquiry has made this seem untenable as the principal interpretation, however, though it is probably one factor in the results. A few considerations bearing upon the point are these: (1) Little selection is present in the student groups rated by the several instructors, and there is no apparent relationship between the slight selection which is present in a few instances and the variations found in the ratings

[2] *Ibid.*

of those groups. (2) A number of cases have been investigated where two instructors rated a number of students in common. Marked differences are found in these comparisons, though they are somewhat less than those represented in tables 1 to 4. (3) In respect to the point just made, however, it may be true that even where the same students are rated, their traits may actually be different in the two sets of circumstances under which two instructors observe them. For example, students may be more accurate or more coöperative under some instructors than under others. (4) Instructors have succeeded in reducing their differences when the desirability of uniform standards of rating has been called to their attention.

The foregoing points emphasize the need for caution in interpreting the differences found among instructors. Some allowance is to be made for actual differences in the students rated by a given instructor. But there remains a strong probability that subjective differences in rating standards and in rating tendencies constitute

TABLE 3

*Distributions of the average deviations of ratings given by each of 15 instructors who rated 12 or more students in Group A*

| TRAITS | AVERAGE DEVIATION OF RATINGS | | | | | | | | AVERAGE OF AVERAGE DEVIATIONS | A.D. OF AVERAGE DEVIATIONS |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.7–0.8 | 0.9–1.1 | 1.0–1.2 | 1.3–1.4 | 1.5–1.6 | 1.7–1.8 | 1.9–2.0 | 2.1–2.2 | | |
| Intelligence | 1 | 2 | 5 | 2 | 3 | 1 | 1 | | 1.3 | 0.26 |
| Industry | | 1 | 2 | 5 | 3 | 1 | 2 | 1 | 1.5 | 0.26 |
| Accuracy | 2 | 1 | 4 | 3 | 3 | 1 | | 1 | 1.4 | 0.28 |
| Coöperativeness | | 3 | 1 | 2 | 6 | 1 | 2 | | 1.5 | 0.26 |
| Initiative | 1 | 4 | 4 | 4 | 2 | | | | 1.2 | 0.19 |
| Moral Trustworthiness | | 2 | 4 | 2 | 2 | 4 | | | 1.4 | 0.26 |
| Leadership Ability | 1 | 4 | 2 | 4 | 2 | | 2 | | 1.3 | 0.29 |

TABLE 4

*Distributions of the average deviations of ratings given by each of 41 instructors who rated 18 or more students in Group B*

| TRAITS | AVERAGE DEVIATION OF RATINGS | | | | | | | | | AVERAGE OF AVERAGE DEVIATIONS | A.D. OF AVERAGE DEVIATIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.5–0.6 | 0.7–0.8 | 0.9–1.0 | 1.1–1.2 | 1.3–1.4 | 1.5–1.6 | 1.7–1.8 | 1.9–2.0 | 2.1–2.2 | | |
| Intelligence | 1 | 1 | 12 | 18 | 6 | 1 | 2 | 1 | | 1.2 | 0.16 |
| Industry | | 1 | 11 | 16 | 8 | 1 | 2 | 2 | | 1.3 | 0.22 |
| Accuracy | 1 | 4 | 10 | 17 | 7 | | 2 | | | 1.2 | 0.16 |
| Coöperativeness | 1 | 5 | 14 | 17 | 3 | 1 | | | | 1.1 | 0.16 |
| Initiative | 1 | 3 | 11 | 15 | 8 | | 2 | 1 | | 1.2 | 0.19 |
| Moral Trustworthiness | 2 | 6 | 19 | 8 | 4 | 1 | 1 | | | 1.1 | 0.19 |
| Leadership Ability | | 5 | 12 | 15 | 5 | 2 | 1 | | 1 | 1.2 | 0.19 |

the principal explanation of the disagreements in sets of ratings from one rater to another.

### CORRELATIONS BETWEEN RATINGS BY TWO INSTRUCTORS AND BETWEEN TWO SETS OF RATINGS BY THE SAME INSTRUCTOR

The second question dealing with the extent of agreement among instructors may now be considered. How well do the raters agree in the standing of individual students relative to one another? How well, that is, do they agree in the order in which they rank the students?

Even though rating tendencies agree, the differences in rating of individuals may disagree so violently that the average ratings are practically worthless. Conversely, even though the rating tendencies are far apart, there may be complete accord as to the relative standing of individuals. Differences in rating standards and differences in the relative ratings assigned individuals are independent of one another. Differences in standards can be readily corrected, once we ascertain the extent to which such differences are present. Differences in the relative ratings of individuals, on the other hand, grow out of different bodies of knowledge concerning the students rated and out of inadequate observation, personal biases, misjudgments, and divergent conceptions of the trait judged. In a sense, then, the degree of agreement in the relative ranking of individuals shows the more inherent possibilities and difficulties of securing useful average ratings of general traits.

The agreement between raters as to the relative position they assign the people rated can best be reported by means of correlation coefficients. Table 5 gives the correlations in Group A for each pair of instructors where more than 12 students were rated in common. Due to the small number of cases and to the fact that one instructor is represented in four of the five pairs, it is questionable how typical these results are.

TABLE 5

*Correlations between ratings by different instructors—Group A*

| PAIRS OF INSTRUCTORS | NUMBER OF CASES | INTELLIGENCE | INDUSTRY | ACCURACY | COÖPERATIVENESS | INITIATIVE | MORAL TRUSTWORTHINESS | LEADERSHIP ABILITY | AVERAGE |
|---|---|---|---|---|---|---|---|---|---|
| N and D | 13 | 0.59 | 0.67 | 0.82 | 0.78 | 0.67 | 0.74 | 0.12 | 0.63 |
| A and L | 14 | 0.25 | 0.71 | 0.42 | 0.42 | 0.19 | 0.57 | 0.23 | 0.34 |
| A and N | 18 | 0.47 | 0.28 | 0.10 | 0.41 | 0.16 | 0.14 | 0.49 | 0.25 |
| A and E | 19 | 0.33 | 0.51 | 0.21 | 0.16 | 0.42 | * | 0.03 | 0.28 |
| A and D | 24 | 0.54 | 0.47 | 0.57 | 0.59 | 0.39 | 0.73 | 0.44 | 0.53 |
| Average..... | | 0.44 | 0.53 | 0.42 | 0.47 | 0.29 | 0.47 | 0.26 | 0.41 |

* Not rated by one instructor.

Table 6 shows the correlation coefficients for pairs of instructors rating Group B.

The two most striking facts about the figures are the very small size of

many of the coefficients, and the marked contrasts between different traits and different pairs of raters. These results point to the need for the greatest caution in accepting any one rater's judgment. They also serve to show why the average ratings received by different students are not more markedly and more reliably different than they are.

The same type of comparison between sets of ratings was made for three instructors each of whom rated the same students twice during the year (with at least three months between the ratings). Table 7 shows the degree of agreement between the sets of ratings. The correlations are very much closer than are those of tables 5 and 6 which show the agreement between pairs of instructors. Nevertheless, the agreement is not as uniformly close as might have been hoped for. There is evidence that instructors change their ratings of particular students considerably from one quarter to the next. To what extent this is reasonable and to be

TABLE 6

*Correlations between ratings by different instructors—Group B*

| PAIRS OF INSTRUCTORS | NUMBER OF CASES | INTELLIGENCE | INDUSTRY | ACCURACY | COÖPERATIVENESS | INITIATIVE | MORAL TRUSTWORTHINESS | LEADERSHIP ABILITY | AVERAGE |
|---|---|---|---|---|---|---|---|---|---|
| T and HH | 22 | 0.22 | 0.42 | 0.28 | 0.24 | 0.24 | * | 0.12 | 0.21 |
| D and C | 20 | 0.05 | 0.30 | 0.37 | 0.04 | 0.36 | * | 0.15 | 0.20 |
| H and S | 20 | 0.35 | 0.59 | 0.35 | 0.29 | 0.33 | 0.61 | 0.64 | 0.45 |
| A and B | 34 | 0.52 | 0.33 | 0.29 | 0.09 | 0.29 | 0.19 | 0.39 | 0.30 |
| HH and S | 20 | 0.62 | 0.77 | 0.73 | 0.65 | 0.64 | 0.67 | 0.43 | 0.64 |
| T and S | 24 | 0.38 | 0.61 | 0.61 | 0.50 | 0.51 | * | 0.51 | 0.52 |
| A and GG | 22 | 0.41 | 0.18 | 0.27 | 0.45 | 0.17 | 0.18 | 0.08 | 0.25 |
| K and R | 17 | 0.90 | 0.37 | 0.59 | 0.45 | 0.51 | 0.31 | 0.22 | 0.48 |
| N and AA | 31 | 0.34 | 0.29 | 0.30 | 0.08 | 0.28 | 0.40 | 0.46 | 0.31 |
| Y and EE | 29 | 0.32 | 0.66 | 0.46 | 0.58 | 0.39 | 0.60 | 0.23 | 0.46 |
| Iand P | 16 | 0.39 | 0.28 | 0.33 | 0.25 | 0.46 | * | 0.39 | 0.35 |
| Average..... | | 0.41 | 0.44 | 0.42 | 0.32 | 0.38 | 0.42 | 0.31 | 0.38 |

* Not rated by one instructor.

TABLE 7

*Correlations between ratings by the same instructor at different times*

| INSTRUCTOR | NUMBER OF RATINGS | INTELLIGENCE | INDUSTRY | ACCURACY | COÖPERATIVENESS | INITIATIVE | MORAL TRUSTWORTHINESS | LEADERSHIP ABILITY | AVERAGE |
|---|---|---|---|---|---|---|---|---|---|
| A | 50 | 0.80 | 0.64 | 0.49 | 0.34 | 0.64 | 0.63 | 0.73 | 0.61 |
| D | 39 | 0.77 | 0.36 | 0.59 | 0.26 | 0.50 | 0.64 | 0.67 | 0.54 |
| GG | 39 | 0.78 | 0.72 | 0.81 | 0.65 | 0.66 | 0.36 | 0.61 | 0.66 |
| Average..... | | 0.78 | 0.57 | 0.63 | 0.42 | 0.57 | 0.54 | 0.67 | 0.60 |

expected, we do not know. We are probably justified in interpreting it as due to insufficient knowledge about the people rated. But it may be that it represents, in part, actual changes in the behavior and attitudes of the students. In any case, this factor is one of the important causes for the unsatisfactory final average ratings.

(*Manuscript received June 5, 1926.*)

# Selective Placement of Metal Workers

## I. Preliminary Studies[1]

By Millicent Pond, *Scovill Manufacturing Company*

*Is there any relationship between a factory worker's intelligence and his success and stability? Can intelligence tests be used to advantage in the selection and placement of factory operatives? Dr. Pond's investigation has gone further than any in recent years, or even in the history of vocational testing, to answer these questions. The first year's investigation, as here reported, yielded only inconclusive results, too tentative to serve as an aid in hiring and placement. In later articles Dr. Pond will present additional and more conclusive evidence which led to the installation of the tests as part of the employment procedure of the Scovill Manufacturing Company.*

This investigation of the use of intelligence tests in the selection of factory workers was made in a New England brass factory. Eight tests were tried out, seven of them taken from the Army series, and one entirely new.

The tests were given to all newly hired workers over a period of a year, though the placement of the men was not affected by their scores.

In order to evaluate the tests for groups doing comparable work, the employees tested were divided into a number of occupational classes based upon their tasks. As criteria for the evaluation of the tests the author used (1) highest weekly pay, (2) increase in earnings, (3) foremen's ratings, and (4) terminations.

No marked agreement was found between earnings, foremen's ratings, and length of service. Interviewers' and examiners' ratings correlated low with foremen's ratings and earnings. Correlations between test scores and factory criteria of success were also very low.

Using as her criterion terminations for reasons other than lack of work, expressed in percentages of employees hired, the author found significant preferred ranges or critical sections in test scores in nine out of twenty-nine occupational groups. The proportion of terminations was considerably less for those whose scores fell within these preferred ranges of test scores. Similar preferred ranges were set off with foremen's ratings as criterion.

[1] This article is a condensed report of a dissertation presented for the degree of Doctor of Philosophy in Yale University. It does not include complete tabulations of the statistical results of the investigation, but these are recorded in full in the dissertation entitled "The Use of Intelligence Tests in the Selective Placement of Metal Workers," deposited in the Yale University Library.

THE problem of the investigation which is to be described in these pages was the validation of a series of psychological tests for use in the selection and placement of factory and office employees of the Scovill Manufacturing Company, of Waterbury, Connecticut. This company employs between five and six thousand men and women, skilled and unskilled, in the manufacture of brass, bronze, and nickel-silver alloys, and of large and small finished articles made of these materials. When the study was begun, no objective measures of individual differences between applicants were in use in the employment office, but it was thought that such measures, if they could be found, might readily supplement the subjective judgments of the interviewers to the extent of reducing significantly, both for employer and for employee, the waste which is entailed by faulty and unsatisfactory placements.

It was the general plan of the experiment to give the same series of tests to every newly hired employee of the company, not for use in placing him, but as the first piece of work which he should perform for his employers; and this over a sufficiently long period of time to yield reliable samples. Subsequently, the scores thus obtained were to be compared with the success or failure of the individual in his work. Success was not to be interpreted too narrowly. Any survey of the records was to be made which would answer the question, Are test scores related to the satisfactoriness of the placement? Four distinct problems are involved:

1. The selection, modification, and restandardization of a suitable series of tests.

2. The selection of reliable measures of the success of the individual at work, or of the satisfactoriness of his placement.

3. The classification of tested employees into homogeneous occupational groups.

4. The search for relationships.

The investigation was started in October, 1923, under the advice and guidance of Prof. J. E. Anderson, at that time connected with the Yale University Laboratory of Psychology.[2] In December of that year the testing of new employees was begun. After six months of testing, in certain roughly separated occupational classes of the subjects, correlations calculated

[2] The writer is glad to acknowledge her indebtedness to the many persons who have aided her in the study: To Prof. Anderson, for his constant helpfulness and stimulating criticisms and suggestions; to Mr. W. S. Berry and Mr. E. H. Davis, both of the Scovill Manufacturing Company, for their generous assistance in matters of factory procedure and statistical resource; to the foremen and general foremen of the company, for their ready coöperation; and to the staffs of the Yale University Psychological Laboratory and the Personnel Research Federation, for technical advice whenever it was sought. Particularly careful and sympathetic work was done on the problem by the research assistants, Mary Miller Dewey, Grace Gailey, Russell Hickman, Caroline T. Hincks, Olive Inglis, and Susan White, and this is gratefully acknowledged. Finally, to Mr. John H. Goss, Vice President and General Superintendent of the Scovill Manufacturing Company, the writer is deeply indebted for opportunity, encouragement and suggestion; and so, indeed, is any one who may profit at all in the future by the fact that this investigation has been made.

between the test scores and the measures of success did not yield conclusive results, and it was decided to wait for further records, which would permit finer subdivisions in the groups of subjects. Correlation after one year of testing, in narrower occupational groups, gave coefficients which were still inconclusive. Another method of handling the results clearly indicated lines for further investigation. Finally, after the testing had continued for two full years, and a still finer classification of the subjects had been made, combinations of test scores were found for each of some sixty occupations for men,[3] which show a significant relation to one of the criteria of success, and are now tentatively in use by the company, pending further verification.

This outlines the progress of the investigation to date. It is the plan of the present article to report the main issues of the first two years of the study, i.e., the reasons for the choice of tests; their modification and method of scoring; the difficulties encountered in the selection of factory criteria of success, and the selection made; the occupational classifications of the subjects; and finally, a summary of the correlations found between test scores and measures of success, both in the tests of the first six months, and in those of the first year. Later articles will present the treatment of records for the two years of testing which led to the formation of hiring scales, and a further study of a special group, that of toolmaking apprentices, which differed in certain interesting respects from the other groups. Finally, it is planned to give some account of experience connected with the introduction of the tests into employment procedure, and a preliminary numerical check on the reliability of the hiring scales in actual use.

[3] The survey of the records of female employees for the second year has not yet been completed.

## INTELLIGENCE TESTS AND OTHER MEASURES

### *1. Selection of Group Intelligence Tests*

The type of test decided upon for the study, as the one best suited to the conditions of the problem and the employment situation of the company, was a standard group intelligence test series, composed of several tests which could be scored separately, having the maximum practical downward and upward range of scores; a series of which some of the tests should be independent of language facility. In view of the fact that, to many investigators, intelligence tests have seemed less promising than trade tests or tests of special aptitudes in problems of factory placement, it will be worth while to consider at some length the particular circumstances affecting the decision.

The Scovill Manufacturing Company makes, pours, rolls, and draws brass and bronze, to be sold as billet, rod, tube, or wire; and it manufactures a large variety of brass, bronze, nickel and steel articles, such as screws, rivets, buttons, fasteners, clips, pins, springs, lamp fixtures, vanity boxes, can-openers, coin blanks, steam valves, and radio and automobile parts. At one time no less than two thousand

different products were counted, each made practically from the raw materials, and each, of course, involving many operations. Since the products are prepared largely under contract orders from other firms, the flow of work of any particular kind is subject to marked fluctuation. At any moment the company may be called upon to manufacture an entirely new product, or to discontinue the manufacture of an old one. This means that the work is organized on the basis of the operations to be performed, rather than upon the resulting products. Any one worker may perform only one type of operation, but he may and does have many different articles, of varying size, shape, and composition, on which to work. Specifications with regard to the quality of workmanship vary with the article and with the requirements of the buying firm, and these variations, too, must be met by the worker. Manifestly, the value of an employee to the company is strongly conditioned by the ease with which he can be shifted from one task to another, i.e., by the repertoire of work which he can and will build up.

Now the ability to make these habit changes easily is essentially a learning ability, and as such it may well be a function of general intelligence. For the purposes of a first investigation, under a program which was to cover all occupations, a series of general intelligence tests was determined upon.

The other factory conditions governing the choice of test may be dealt with more briefly. Group tests were decided upon instead of individual tests, because applicants tend to appear in great numbers on certain days and at certain hours; they do not present themselves in a steady stream at the employment office. In months when hiring is light it is still advisable to be ready to test applicants in groups at certain hours, while in months of heavy hiring this is imperative.

Although there was no definite information with regard to the requisite range of scores prior to the beginning of the experiment, there was a strong indication that it would be wide. The type of work of the company calls for many degrees of skill, from expert toolmaking and designing to light bench work and general labor. Every new employee, from the least skilled to the highest, was if possible to be measured by the tests. Until evidence should be brought to the contrary, it was assumed that for every applicant who could meet the physical requirements of the company, some suitable work in the factory could be found. Such an assumption involved the use of tests which would cover the maximum downward range of scores, and at least a reasonable upward range.

Finally, provision was necessary for one large class of employees, the non-English reading and especially the non-English speaking individuals. Fully one-half of the new employees of the company do not read English fluently enough to be tested fairly in our language; a smaller but still significant number do not speak English at all. No reason exists for their exclusion from the factory on that account because with interpreters available in all departments and foremen themselves frequently able to speak more than one language, very

little difficulty is experienced in giving directions, even to persons who have recently come to the United States. Certainly, therefore, some of the tests selected would have to be of the non-language type.

The selection, not of the type of tests to be used in the study, but of the actual test forms, was made from the series of intelligence tests devised and standardized by the Division of Psychology of the Surgeon General's Office of the United States Army during the late war, a full account of which may be found in the Memoirs of the National Academy of Sciences, Vol. XV. Four of the tests selected are from the non-language group called Beta, and three from the Alpha group, which requires facility in reading English. They were selected for their validity as tests of intelligence according to the report of the Division of Psychology; for the extent to which their distributions approach the normal frequency curve; and for their range. With the numbers assigned to them for this investigation, they are as follows: (1) Pictorial Completion, (2) Number Checking, (3) Digit-Symbol Substitution, (4) Geometrical Construction, (5) Arithmetical Reasoning, (6) Synonym-Antonym, and (7) Analogies.

### 2. *Modification of the Tests*

When a test, standardized under certain conditions, is appropriated for a new use, comparable results cannot be expected unless precautions are taken against any essential modification of test or method of administration. Although this principle was recognized in the present instance, certain changes were considered necessary. The most important of these was an alteration in the method of presentation amounting to greater care in the preliminary practice work. In the army procedure, samples for each of the Beta tests were painted on a blackboard, and demonstrated in graphic pantomime, but they were not printed in the booklets. Samples for the Alpha tests, on the other hand, were printed in the test booklets, with the correct answers filled in, but they were not painted on the board. The examiner read the directions out loud, calling attention to the printed form. In the present experiment, for language and non-language tests alike, the samples were painted on boards and also printed *without solutions* in the books. The groups of subjects tested at any one time were smaller than those of the army, and the tests were usually given by one person only. This person, known as the examiner, combined the duties of the army examiner, demonstrator, and orderlies, and saw to it that every subject had practice, before the beginning of each test, by actually filling out the samples in his book. Except for this modification, the demonstration was as nearly like that of the army presentation as possible, both in wording and in gesture, and no amplification of an established procedure was permitted.

It is not probable that the additional emphasis and opportunity for practice thus given had any effect on the relative difficulty or validity of the various items within any test, but it may have had a decided effect upon the relative difficulty of the separate tests. From the discussion on method

of scoring given below, however, it will appear that this source of error was controlled by a partial restandardization of the tests.

Other alterations were in the nature of additions to the test content. In the army report, the distributions of two of the Beta tests, namely, number checking and digit-symbol substitution, were restricted in the upper ranges, which meant either that the tests were too easy or the time limits too long for some of the subjects. Since it was desirable to keep the standard time limits, ten items were added to each of these tests. These were similar to the other items of the tests in question, and since they were added at the end only those subjects were affected who would otherwise have finished the tests within the time limits.

The geometrical construction test, on the other hand, showed by its distribution in the army work that both easier and more difficult items were needed. There were undistributed scores at both ends of the scale. Accordingly, this test was thoroughly revised, and then restandardized. Thirty constructions of varying difficulty, similar to and including the twelve of the original test, were presented one by one to each of fourteen subjects, and separately timed. They were arranged in order of average time required by these subjects to solve them. It was found that the curvilinear constructions varied more than rectilinear constructions, and the former were therefore discarded entirely, although it may be that validity would have been increased by keeping them. Of the rectilinear forms, eighteen were chosen for the test. The last three are very difficult and the first four very easy; between these extremes, the steps are fairly even. The time limit was set at three minutes.

### *3. A New Test*

In addition to the seven tests taken from the army series, an eighth was devised in an attempt to secure, if possible, the significant conditions of a peg-board test with the added advantage of group use and of self-recorded scores. The test form consisted of numerous rows of circles, the size of a small typed "o." After three practice periods with the dominant hand, alternating with certain prescribed activity of the other hand and of both hands together,[4] the subject was asked to make a stroke through every circle of a given row, as quickly as he could. At the end of fifteen seconds he was stopped. The score for the test was the number of circles marked. The test was an easy one to give; it ordinarily secured the interest of the subjects much as a race might have done; and it gave some few results which were not furnished by the other tests. Whether or not these really do resemble the results from any peg-board test has not been determined.

[4] This practice work, and the incidental work of the other hand and of both hands were originally intended to be part of the test. They are still timed and scored, and the scores recorded. Patterns were attempted such as "skip one circle each time," "skip one circle, then two, then one, then two," etc. The correlations of the scores in each part of the test with the total score were sufficiently high, however, to warrant the use of only one score for the test.

*4. Form of the Tests*

The eight tests of the Scovill series were printed together in booklet form and called the Classification Test Series, in order to emphasize the idea of their possible use for selective placement rather than for exclusion from employment. The samples for each test were printed on the page preceding the test, beginning with the cover page. This created the mechanical necessity of turning the page before the test itself could be seen or begun, and the examiner had little difficulty in timing accurately. The tests were arranged in order of difficulty of their first items; it was therefore possible to release each subject from the test room as soon as he reached the point where the first items of the later tests proved too difficult for him. This procedure of selective dismissal was based upon statistics of the first five hundred cases, and was consistently carried out. It had an important practical bearing in the experiment in reducing the time spent upon the tests and the embarrassment of the less able subjects. Under the scoring methods used it caused little, if any, disturbance in the test results.

*5. Scoring the Tests*

The scoring of the tests presented several points to be considered. In the first place, according to the army procedure, the scores in the single tests, which were in terms of the number of correct responses or of the correct minus the incorrect responses, were not comparable. Some had twenty items and some had forty, and the difficulty of the very first item was not the same in all tests. Secondly, the Alpha and Beta series had been scored and reported separately, whereas the present plan was to use them together. Finally, in the army procedure where the final score was the sum of the scores in the separate tests, failure to score in any test of the series was seriously penalized, whether the failure was accidental (test not given), or not. The proposed plan of the Scovill study made it highly desirable that the scores in all of the tests should be comparable, and definitely called for some scheme whereby results from the Alpha and Beta series could be combined. Moreover, only a few of the original tests from each series were to be used, and it was clear that all Scovill records, in the light of the army usage, would be incomplete ones, particularly those of non-English reading persons.

It is not to be supposed that the Division of Psychology had no method for filling out theoretically an incomplete record, or for combining the two series of tests, but the calculations for both of these processes are complicated, and under Scovill conditions would have to be carried out for every subject tested. It was simpler to use another method of scoring.

This simpler method was that of expressing the scores in each test in terms of standard deviations. For the first 257 subjects who scored in all tests, the distributions being nearly normal, the mean and standard deviation were calculated for each test. Then a common mean and standard deviation were chosen which would put the majority of scores above 100 (thus clearing them from the conno-

tations of school grades and percentage ratings in general), and for each test a simple linear formula[5] was derived which converted the raw scores of the test into a scale having the common parameter. This process in effect transposed the original scores, which could not be compared with one another, to a common scale in which they could be so compared, but without the alteration of any of the original properties. With this arrangement, the final score for each subject was the average, instead of the sum of the scores earned in the single tests; there was then no penalty, except that of reduced reliability, in the final score of the person who could not score in all tests; and the language and non-language tests were ready to be used together in a single series.

The circle marking test, Test 8, was never standardized against the others, nor included in the final score, because there was no good opportunity to check it against outside criteria of intelligence. Its distribution is normal, and its correlation with the other tests of the series, in a group of subjects who scored in all tests, ranges from $r = +0.12 \pm 0.04$ to $r = +0.50 \pm 0.03$, average, $r = +0.28 \pm 0.04$. For Test 8 and final score, $r = +0.42 \pm 0.04$; Test 8 and age, $r = -0.15 \pm 0.04$; Test 8 and years of schooling, $r = +0.26 \pm 0.04$.

[5] $$Y = \frac{\sigma_y}{\sigma_x} X + M_y - \frac{\sigma_y}{\sigma_x} M_x$$

where $M_x$ and $\sigma_x$ are the mean and standard deviation of the raw scores, $M_y$ and $\sigma_y$ are the mean and standard deviation of the standardized scores, $X$, a given raw score, and $Y$, the new score corresponding to it.

In practice, a table of raw and converted scores is much more readily used than a formula.

### 6. Other Measures

Besides the test scores recorded for each new employee, careful entry was made of the age of the subject in years and months at the time of hiring, and of the years of schooling which he had enjoyed. Schooling was handled rather arbitrarily: for schooling in the United States, the number of the grade completed was assumed to be equal to the number of years of school attendance, but for other countries, the number of years given by the employee was taken at its face value. Since not much reliance could be put upon the figures for years of schooling in any event, the reported years of night school attendance were also taken at their face value, with no attempt to evaluate them in terms of courses taken or ground covered.

Finally, another item of some interest which was recorded for each new employee was the double set of subjective ratings made in the employment office, one by an employment clerk, the other by the examiner in the test room. The observations in both cases were in the form of ratings on five qualities, known as understanding (intelligence), willingness, speed, initiative, and neatness, and each was made on a rating scale with five divisions. The intention was to correlate these two sets of ratings with each other, with the scores, and with the measures of success, as an incidental but interesting portion of the study.

## FACTORY CRITERIA OF SUCCESS

### 1. Lack of Reliable Measures of Success

A condition soon realized in connection with the test experiment was

that there existed no thoroughly objective and wholly reliable measure of success of a new employee in his work. Rates of pay, even on a piecework basis, were influenced by many mechanical factors; production measures suffered from the great variety in the units of work; foremen's ratings were subjective; and finally, terminations, though they might indicate failure to satisfy supervisors, or to find satisfaction in the work, might also be due to conditions which had little connection with the occupation itself.

These sources of unreliability in the factory criteria of success were themselves unmeasured, and difficult to evaluate in any way. There was always the possibility that in spite of them, significant relationships might be found between the criteria of success and the test scores. There was always the possibility that work with these measures might lead to the discovery of methods for control of the sources of error. It was decided therefore to study, and then try to use, three of them.

### *2. Earnings*

The mechanical factors which limited the usefulness of rate of pay as a measure of success were such things as fixed speed on certain machines, which limited production; breakdown of machines, and other interruptions to the flow of work, not the fault of the worker; contingent payment, a day-rate payment made to the employee to compensate for irregularities due to managerial delays and irregularities in production during a learning period; the small range of possible earnings in some of the unskilled work, which would tend to lower correlations; to say nothing of individual differences in previous training, experience, or length of service, which in any given case might affect the pay. Moreover, the earnings based upon group production raise certain questions. If the groups compete with one another, and there is promotion on the basis of ability from one group to another, or if the members of a proficient group refuse to tolerate the presence of a weakling, then group earnings should serve quite well as measures of individual success. On the other hand, if it is the policy of the foreman to keep the groups evenly balanced and to encourage the more proficient members of a group habitually to assist the less proficient, in order that the production of each group may be maintained at an accepted level, then the earnings of the group are without value as measures.

Even with these limitations, however, it was thought that earnings might be found useful. They are more objective than ratings, and they reflect something more than mere failure to terminate. Compared with production measures, they are much to be preferred, provided the piece rates have been carefully set, because the very process of rate setting is one of evaluating the units of production. A screw versus a Cape Cod lighter, a pound of screws versus a pound of paper clips—in a given operation on these articles, what are comparable units? Production measures used as a criterion of success would inevitably raise this question, but piece rates provide a

logical answer to it. As we have said, the sources of error in earnings as measures had been guessed at, not evaluated,—they might have been overestimated. Chance errors would lower correlations, not raise them. It was decided to inquire whether any relation existed between earnings and test scores which would show a significant correlation over and above the errors.

Earnings were studied only in the first large sample of subjects, the six months sample. For each employee a record was made of the average hourly earnings for the first, third, fifth, seventh, ninth, and twelfth weeks after hiring. The largest of these figures was called the highest pay; the difference between that and the beginning rate was called progress in pay. Contingent payments were not separated out. Records were made for all tested employees, regardless of whether they were working under day-work or piece-work rates, but certain of the correlations were calculated for piece-work subjects only. Some of the employees did not stay twelve weeks, in which case their records were curtailed,—they might have made higher records if they had stayed. In order to recognize the possible error in this situation, correlations were calculated in particular long-service, or short-service subdivisions of the sample. It is admitted that twelve weeks is not a sufficiently long period to yield conclusive findings, but for a large amount of the unskilled, and some of the semi-skilled work, it covers the whole of the preliminary period of adjustment.

### *3. Foremen's Ratings*

In spite of the subjective character of ratings and the fact that ordinarily only one foreman would be available for rating any one employee in a single type of work, an attempt was made to use foremen's ratings as a measure of success. The ratings had to be collected especially for the purpose of the experiment, and the foremen had to be instructed on how to rate. A great deal of time and care were put upon the procedure.

In the first place, a form was constructed which contained space for the name, location, occupation, and identification number of the employee, scales for the rating of the employee in each of four qualities, a short paragraph of instructions to the foreman with regard to their use, and various questions concerning the exact type of work performed by the employee at the time of the rating. These follow-up slips were sent to the foreman two weeks after the date of hiring of each employee, and again after two months. The first record provided something by way of information in the case of a person who left the employ of the company soon after he was hired, but it was not considered final. For all employees who remained at work two months or more the second rating was used.

The four qualities to be rated were expressed on the follow-up slip as follows:

1. Ability to learn new work, or mental alertness.

2. Quantity of work, or physical speed.

3. Quality of work, or physical skill.

4. Persistence, or mental and physical perseverance.

These terms were carefully discussed with the foremen,—their significance and the ways in which they might manifest themselves in the subjects to be rated were discussed not once, but many times. Sample analyses of hypothetical cases were made. At first, some member of the test research force was always present when subjects were to be rated, and throughout the experiment the foremen themselves frequently brought up puzzling cases for discussion. The ratings were strictly confidential, and this the foremen knew.

According to the expert advice of the day,[6] rating scales give the most nearly valid results when certain schemes are used to clarify their meaning and to increase the number of different ratings made. Adjectives, carefully chosen to make more vivid the difference between the possession of much or little of each given quality, are placed under the scales at suitable distances from one another, but the scales themselves are not subdivided. The judges are urged to weigh the applicability of the adjectives to the subjects to be rated, but not necessarily to place the mark directly above any one of them. A subject may be conceived of as falling anywhere between two of the adjectives of the scale.

In the following two particulars, the scales used in the present experiment were contrary to the accepted procedure. As an outcome of experience, they were provided with no adjectives, and they were frankly marked off in sections. In a preliminary trial of scales which had adjectives and no divisions, lasting for two months, it was found that the attention of the foremen was very seriously diverted from the central problem of rating. Long and inconclusive arguments arose concerning the choice of certain of the terms and their relative positions on the scales. Sometimes the foreman insisted upon making two ratings on one scale for a single employee, because both of the adjectives suited the case. Sometimes he could not pick out any that described the subject. In addition to this, the scales were neither flexible nor undivided except in the fond imagination of the person who devised them, for all of the foremen's ratings were huddled in the regions directly above the adjectives. Thus, in effect the scales were limited to ranges of not more than five points; and it appeared that no set of adjectives would carry the same meanings to the different judges who were to make the ratings.

The simplified scales were adopted before any of the second ratings were secured. They were divided into nine sections, the middle one indicated by a mark. Nine sections were not too many, as might have been thought at first, because foremen, like any other judges, have individual differences in

[6] Paterson, Donald G. Methods of Rating Human Qualities. Annals, 1923, Vol. 110, 81–93.

Paterson, Donald G. The Graphic Rating Scale. Journal of Personnel Research, 1922, Vol. 1, 361–376.

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rating, using different parts of any scale which may be furnished them. The long scale gave leeway for these differences. The foreman whose tendency it was to rate his employees high could use a section two points above the middle for his average, and still have a range of five sections for his ratings, and similarly for the foreman who tended to rate low.

One hundred and twenty foremen made ratings on employees during the first year of the investigation; forty-four made twenty ratings or more, thirty-five made from seven to nineteen ratings, and forty-one made six or less. Most of the distributions of ratings made by a single foreman were well spread out, and most of them were normal. Their means and standard deviations were not alike, however, and adjustment had to be made for this difference. The occupational groups of employees to be studied were in many cases made up of persons from different departments and therefore working under different foremen. It was essential that the ratings given them by their foremen should be comparable.

This condition was taken care of in the same way that the scores in the tests were made comparable to one another. For every foreman who made more than six ratings, the mean and standard deviation of his ratings were found, and by using the same formula which was given for the standardization of the tests, his ratings were transposed to a scale having its mean at the middle section of the printed rating scale, and its range practically the nine divisions, i.e., $M = 5$, $\sigma = 1.3$. The actual result of this standardization, with the ratings of foremen who rated less than seven subjects added in as they were, was a normal distribution, with $M = 5.05$ and $\sigma = 1.33$.

The foreman's ratings on the four qualities,—mental alertness, quantity, quality, and persistence,—showed an extremely high halo effect. This was noticed from the beginning, and was vigorously combated in the discussions about the scales, but it persisted nevertheless. In a random sample taken from all classes of work in the year's hiring, numbering 338 subjects all of whom had received the second rating, the correlations of the ratings in each of the four qualities with the average of all of them were as follows: $r = +0.96$, $r = +0.95$, $r = +0.96$, $r = +0.93$, P.E. $= 0.00$. Consequently, no comparisons were made between ratings in the different qualities, and only the average rating was used for correlating with the test scores and other measures.

### 4. *Terminations*

The third measure of success used in this experiment was a turnover figure. Here, too, there were many variables. An employee might leave his position because he was not able, physically or mentally, to do the work in question; or he might leave because he was able to secure work which seemed to him more desirable and which he at least judged himself able to do. He might leave because he considered the pay too small, or for reasons connected with the working conditions or the personalities of other employees. His own personality might come into question. He might

leave on account of home conditions. He might be laid off on account of lack of work. In many instances it appeared that a complex of reasons had operated toward the separation, of which it was difficult to determine the most important.

If one were able to classify the reasons for leaving by causes, and to separate out just those cases which indicate a relation between termination and the ability to do the work assigned, the situation would be ideal. Such classes would be: Terminations, personal, due to inability to do the work; terminations, personal, due to ability to do higher grade work, and opportunity to secure it; terminations or transfers, initiated by the company, due to inability of the employee to do the work; promotions, due to ability of the employee to do higher grade work. All terminations under reasons other than these could be ignored, since they would be free from any connection with ability.

As a matter of fact, it was entirely impossible during the period of this experiment to make any such classification of reasons, and there is little hope that it could ever be made. It is difficult enough to secure a distinction from the foremen between, "Laid off because unable to do the kind of work available," which would give an indication of ability, and "Laid off on account of lack of work," which would ordinarily indicate only short service relative to other employees in the room. How much more difficult would it be to make any classification of the employee's reason for voluntarily leaving, on the basis of his ability to do the work! In general it is probably true that no resignation, lay-off, or discharge is entirely due to the episode which precipitates it, nor wholly ascribable to the termination reason given.

Why, then, the decision to use a turnover figure for study in this experiment? Again we call attention to the fact that the sources of error have been described, but not evaluated. Considering the human tendency to avoid acknowledging a disagreeable fact even to oneself, the tendency to find excuses and to rationalize, may it not be possible that termination has actually been influenced by ability much more frequently than estimated by those of us who have tried to record and to analyze the reasons given for exits? We have stressed the multiplicity of causes, but to some extent they may have been only a multiplicity of excuses. It would seem that there might exist, in spite of them, an underlying significant relationship between termination and ability at work, between ability at work and ability in the tests, and therefore, between termination and test scores.

The men and women who were tested during the experiment constituted a rather special group of employees, in that they were the people who at any given time had most recently been hired. They formed a layer of the whole personnel, rather than a cross-section. In this group, of course, the percentage of termination was much higher than in the total payroll, and this in itself was a good secondary reason for studying the termination relationships. The notoriously high percentage of termina-

tions in newly hired groups of employees ought to be grist to the mill of personnel research.

Because of the special character of the tested group of employees, the word "turnover," which implies the use of the total number on roll as a basis of calculation, was dropped and "termination" used instead. Two expressions of termination were studied at different times: one was the length of service of the terminated employee in weeks, which could be correlated directly with the test scores; the other was the percentage of terminations which had taken place in the tested group up to a given date. For the six months sample this date was ten weeks after the last person in the sample was hired, for the year sample it was three months after the hiring of the last person. As will be seen below, this measure was not correlated with the scores, although it might have been; it was charted as a distribution of the percentage of terminations for each ten-point interval in the scale of the final score.

### THE SUBJECTS

The application of the Classification Test Series to all newly hired employees of the company began December 1, 1923. From the daily accumulating records samples were drawn from time to time, first for the standardization of the test scores described above, then for a study of the significance of the subjective ratings made by the employment interviewers and the examiners, and finally for the search for relationship between the test scores and the measures of success at work of all the new employees who were hired within given periods of time. The first of these periods was one of six months, from December 1, 1923, to May 28, 1924; the second was a year, from December 1, 1923, to December 1, 1924. In the course of the time covered by these two samples some of the tested employees were transferred from their original positions to new work or new departments, and some of those who had terminated were rehired. In either case, except when the employee was rehired to the same work within two months after his termination, the test record was copied on a second card, and both were used. In other words, in a new position, the employee counted as a new man.

At the end of six months of testing, when the first large sample was closed, the 1299 records were sorted into twelve groups, eight male and four female, representing broad occupational divisions. These groups numbered from 22 to 400 subjects, and were given the following titles: Machine work, male; machine work, female; bench work, male; bench work, female; semi-skilled, male; semi-skilled, female (buffing only); utility, male (i.e., common labor); hot work, male; boys' work; skilled work, male; clerical work, male; and clerical work, female. Each of these groups included a number of occupational names, such as dial press operator, lathe operator, and tapping machine operator for the machine operators, and inspector, packer, and solderer for the bench work. The assignment of the different occupations to these groups was made with care from information secured from the foremen,

and from the reports of members of the test research force who watched all of the work and collaborated in making the classification.

It was evident from the correlations in the twelve subdivisions of the six months sample, given in summarized form in a later section of this report, that a finer classification by occupations was needed. This would necessitate a more discriminating analysis of the actual tasks of the individuals who had been grouped together. At the time, however, many of the groups were too small for subdivision. Therefore the study was extended to cover a year's hiring.

The second classification was the same kind of a descriptive, codifying analysis as the first, based upon more records and also upon more occupational names. Again each foreman was consulted upon all the types of work for which new employees had entered his department within the year, and questioned as to the exact meaning of the terms used in work description, duties involved, motions and speed required, lines of promotion open, regular changes of occupation for certain workers, and relative amount of intelligence which he thought was required for different tasks. Comparisons were made between the occupations in different departments which were known by the same title, because sometimes these were found to be alike, and sometimes not; and similarly, an effort was made to discover tasks in different departments under different titles, which were essentially the same. The work was revisited and watched. Finally, the many types of work were sorted into thirty-two occupational classes, male and female, on the basis of what were judged to be similar intellectual and neuromuscular response requirements.

The total number of records in the year sample was 2703. The occupational groups, with the numbers of subjects included in them, were as follows:

Machine, female.
Automatic feed 40; simple feed, 49; rhythmic feed, 65; presses, 237; buffing, 96.

Bench, female.
Inspecting, 105; inspecting and stringing-up, 85; hand work in rooms called Burner No. 1 and No. 2, 99; Burner No. 3, 32; miscellaneous, 84.

Office, female.
All types, 36.

Machine, male (unskilled).
Light, 77; heavy, 126; buffing and polishing, 33.

Bench, male (unskilled).
Inspecting, 77; radio condenser assembling, 23; stringing-up (for boys), 104; miscellaneous, 60.

Utility, male.
Floormen (not including foundry), 88; laborers, mills, 267; laborers under overheated conditions (includes floormen, foundry), 124; laborers, construction and yard, 104; miscellaneous, 121.

Skilled, male.
Toolmakers, machinists, milling machine operators, pattern makers, tool grinders, 68; toolsetters, 74; electricians, blacksmiths, carpenters, tinsmiths, plumbers, iron-workers, millwrights, and riggers, 72.

Semi-skilled, male.
Automatic screw machine operators, 97; painters, masons, steamfitters, 68; hot forgers, hardeners, die polishers, brass rollers, wire machine operators, 25; dippers, lacquerers, platers, annealers, 26; operators of electrical conveyances, 41.

Office, male.
Checkers, time-keepers, scalemen, stockmen, shippers, 71; miscellaneous, from errand boys to estimators and purveyors, 29.

Although the main headings in this classification resemble the division names in the six months sample, the groups are not to be considered identical, because of the revision which took place in the analysis of work.

It will be clear from the list given above that some of the classes were at this time still too heterogeneous in type of work to be final. No study was made of the three office groups for this reason, and the skilled and semi-skilled classes, when they were studied at all, were regarded as very tentative.

## RESULTS

### *1. Distributions*

Since the form of distribution is important in correlation, we may consider very briefly at the beginning of this section on results, the character of the various ranges of scores and measures as noted in the year sample. The standardized scores in the first seven tests ranged from about 100 (as low as 70 in one test) to 200, and were distributed in five-point class intervals. Except for a slight distortion, due to the fact that the coefficient of $X$ in the formula used for the standardization of each test was not in any case a multiple of five, the distributions of all the subjects who scored in the tests were nearly normal. Tests 1 to 5 inclusive and Test 8 were especially close to the normal probability curve in form of distribution of scores. These were the four non-language tests, the arithmetical reasoning test, and the circle marking test. The synonym-antonym and the analogies tests were skewed, with higher incidence in the lower scores. Of the 2703 individuals tested, only 6 were unable to score in any of the first seven tests, but considering each test separately, there were from 79 to 615 failures to score in the non-language tests, and from 1245 to 1434 in the language tests.[7] Only 27 failed to score in the circle marking test.

In spite of the standardization of the tests in a large group of subjects, the means of the distributions in the year sample were not the same for all tests. If it is recalled, however, that the standardization sample was composed of subjects all of whom scored in every test, whereas the year sample includes all individuals tested, these differences can be accounted for. The inclusion of a greater number of low scored persons in the tests which have the longer downward ranges would automatically reduce the size of the means. This is what has occurred. Ranked by their means, and then by the number of subjects who failed to score, the tests fall into precisely the same arrangement.

The distribution for years of schooling has a high piling up of cases with no schooling at all (11 per cent of the sample), and a still higher peak for eight years completed (23 per cent). A small peak (4 per cent) occurs for twelve years, i.e., high school completed. Otherwise, the distribution

[7] In a limited number of these cases the subject may have been dismissed from the test room without having been given all of the tests in which he could have performed.

is normal, with the mean 6.69 years and standard deviation 3.42 years.

Age at date of hiring is severely skewed. No persons were under sixteen years of age, 50 per cent were under 26, 68 per cent under 30, 80 per cent under 34, and 90 per cent under 40. It is clear that the incoming population of this industry is predominantly young. The mean was 27.12 years, standard deviation 8.20 years.

As already stated, the distribution of the foremen's ratings was normal. Earnings and length of service were not distributed for the whole sample; in the occupational samples earnings were ordinarily normal, but the length of service was always severely skewed, due to the large number of terminations in the first months after the hiring date.

### 2. *Correlations*

The major part of the search for relationships between the test scores or employment measures and the factory criteria of success, both in the six months sample and in the year sample, was in the form of correlation computations. Perhaps the best way to report this work clearly and briefly is to arrange the coefficients of correlation in several frequency tables.

One condition which should be noted particularly with regard to these tables is the fact that the numbers of subjects corresponding to the correlation coefficients vary constantly. Not only were the occupational groups different in size but sometimes only parts of them were used, as when length of service was studied in groups of terminated employees. Especially was this true for the correlation of scores in the separate tests, for there nearly every sample used for correlation was of a different size, depending on the number of persons in the group who were able to score in each test.

This variation in the number of subjects makes it important to show the reliability of each correlation in some compact way. To the right of each column of $r$ frequencies there appears another series of numbers. These are the frequencies of reliable $r$'s in the preceding column i.e., those which are at least three times the size of their probable errors. No coefficients are reported for groups numbering less than twenty subjects.

All correlation coefficients were calculated by the Pearson product-moment formula, uncorrected.

Of the twelve occupational groups which composed the whole sample, as described above, only ten were studied for the relationships between test scores and measures of success at work. The clerical groups were omitted. In each of the ten groups, comparisons were made between the final scores in the tests and each of the criteria of success, foremen's ratings, highest pay, and progress in pay; also between scores in Test 8 and these criteria. The resulting correlation coefficients are shown distributed according to size, in the second column of table 1. The majority of the coefficients are small, and only seven of the sixty are reliable; the range is from $r = -0.47$ to $r = +0.22$. The mean of the coefficients is $-0.025$; the mean regardless of sign is 0.133.

The next comparisons were made in especially reduced samples, reduced in the same way for all ten occupations.

Thus in order to clear the analysis from the confusion which arises in the presence of both piece-work and day-work earnings in the samples, correlations of final score and scores in Test 8 with highest pay and progress in pay were calculated in samples of the piece-rate workers only, taken from each occupation. In another series of reduced samples, the length of service in weeks was correlated with the final scores of all employees who had terminated for any reason except lack of work from each occupation prior to August 18, 1924. Complementary to these groups were the groups of the non-terminated employees of each occupation at the same date, in which final score and scores in Test 8 were correlated with foremen's rating, highest pay, and progress in pay, as above. This sampling, it was thought, might have shown changes in the coefficients due to the elimination of the employees

TABLE 1

*Correlations of employment measures with factory criteria of success*

Six months sample; ten occupational groups. Number of subjects, 20 to 400

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| +0.40 to +0.49 | | | | | 1 | 1 |
| +0.30 to +0.39 | | | 1 | 0 | 6 | 5 |
| +0.20 to +0.29 | 2 | 0 | 12 | 0 | 11 | 7 |
| +0.10 to +0.19 | 14 | 0 | 20 | 0 | 31 | 5 |
| +0.00 to +0.09 | 13 | 0 | 19 | 0 | 18 | 0 |
| −0.10 to −0.01 | 13 | 1 | 15 | 0 | 11 | 0 |
| −0.20 to −0.11 | 10 | 2 | 17 | 2 | 6 | 0 |
| −0.30 to −0.21 | 3 | 2 | 5 | 0 | 5 | 1 |
| −0.40 to −0.31 | 4 | 1 | 2 | 2 | 4 | 2 |
| −0.50 to −0.41 | 1 | 1 | 2 | 2 | | |
| −0.60 to −0.51 | | | 1 | 1 | | |
| Total | 60 | 7 | 94 | 7 | 93 | 21 |
| Mean $r$ | −0.025 | −0.236 | 0.006 | −0.35 | 0.062 | 0.179 |
| Mean $\lvert r \rvert$ | 0.133 | 0.236 | 0.132 | 0.35 | 0.142 | 0.269 |

Column 1. Value of correlation coefficients ($r$).

Column 2. Frequencies of correlation coefficients: final score and scores in Test 8 correlated with foremen's ratings, highest pay, and progress in pay, full samples.

Column 3. Frequencies of correlation coefficients in Column 2 which are at least three times as large as their probable errors.

Column 4. Frequencies of correlation coefficients: final score and scores in Test 8 correlated with highest pay and progress in pay, in piece-work subsamples; final score with length of service in subsamples of terminated employees; and final score and scores in Test 8 correlated with foremen's rating, highest pay, and progress in pay in subsamples of non-terminated employees.

Column 5. Frequencies of correlation coefficients in Column 4 which are at least three times as large as their probable errors.

Column 6. Frequencies of correlation coefficients: scores in the separate tests, final score and years of schooling correlated with foremen's ratings, unstandardized.

Column 7. Frequencies of correlation coefficients in Column 6 which are at least three times as large as their probable errors.

who stayed so short a time that their records in each of the criteria of success were incomplete.

These three groups of correlations are shown in the fourth column of table 1. Again the majority of the coefficients are small, and only seven of the ninety-four are reliable. The range is from $r = -0.58$ to $r = 0.30$; the mean of the coefficients is 0.006; the mean of their values regardless of sign is 0.132. There is no change in character from the coefficients given in the preceding columns.

The last two columns of the table refer to the correlation of the foremen's ratings, unstandardized, with scores in the single tests, with final score, and with years of schooling. Although reported last, these were calculated first, but they were not recalculated after the foremen's ratings had been standardized, because of the plan to repeat the correlations in the year sample. Here we note that although most of the coefficients are still small the number of reliable ones has increased distinctly—twenty-one out of ninety-three. The range of these coefficients is from $r = -0.40$ to $r = +0.43$. The mean is $+0.15$, and the mean of the values regardless of sign is 0.269.

So far as it goes, the increase in the number of reliable coefficients in the sixth column of the table does not mean very much, but it was looked upon as an indication that the study of the separate tests in occupational groups of greater homogeneity than those of the six months sample might yield more significant results.

Certain intercorrelations among the various measures of success were calculated in the six months sample. These were as follows: Foremen's ratings with highest pay and with progress in pay, in the full occupational samples; foremen's ratings with highest pay and with progress in pay in the piece-work subsamples; and length of service with highest pay in the termination subsamples. The coefficients are shown in table 2. The

TABLE 2

*Intercorrelation of the criteria of success*

Six months sample; ten occupational groups. Number of subjects, 22 to 400.

| 1 | 2 | 3 |
|---|---|---|
| +0.50 to +0.59 | 1 | 1 |
| +0.40 to +0.49 | 5 | 4 |
| +0.30 to +0.39 | 7 | 6 |
| +0.20 to +0.29 | 11 | 6 |
| +0.10 to +0.19 | 10 | |
| +0.00 to +0.09 | 5 | |
| −0.10 to −0.01 | 2 | |
| −0.20 to −0.11 | 2 | |
| −0.30 to −0.21 | | |
| −0.40 to −0.31 | 1 | |
| Total | 44 | 17 |
| Mean $r$ | +0.205 | +0.35 |
| Mean $\lvert r \rvert$ | 0.25 | 0.35 |

Column 1. Values of correlation coefficients ($r$).

Column 2. Frequencies of $r$'s.

Frequencies of the $r$'s which are at least three times their probable errors.

measures of success correlate higher with one another than they do with the test scores, and there are more reliable coefficients; nevertheless in general the intercorrelations are not high. The mean is 0.205; the mean of the values regardless of sign is 0.25.

Before going on to the year sample, let us consider for a moment the results of correlations of the interviewers'

and the examiners' subjective ratings of the new employees at the time that they were hired with the criteria of success.

The five ratings on each new employee were averaged, both for the interviewers and for the examiners, because of the strong halo effect between them. They were then correlated with the foremen's ratings, highest pay, and progress in pay in each of the ten factory groups of the six months sample. The results are given in table 3. These correlation coefficients are likewise small, and for the most part unreliable. Of the seven reliable coefficients, six are negative. If a measure is objective, a negative correlation with the criterion is as significant, ordinarily, as a positive one, but a subjective rating which shows negative correlation indicates that the rater's judgment is so far wrong as to be inverse.

Both sets of ratings correlated more highly with the test scores than they did with measures of success at work. For the same occupational groups, correlation of these ratings with the final scores in the tests gave coefficients from +0.03 to +0.61, average +0.41, for the interviewers, and for the examiners +0.67 to +0.79, average +0.73. The higher correlation of the examiners' ratings, is due, of course, to the fact that they were

TABLE 3

*Correlation of interviewers' and examiners' ratings with criteria of success*

Six months sample; ten occupational groups. Number of subjects, 20 to 227.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| +0.30 to +0.39 | 1 | 1 | | |
| +0.20 to +0.29 | 4 | 0 | 2 | 0 |
| +0.10 to +0.19 | 6 | 0 | 4 | 0 |
| +0.00 to +0.09 | 9 | 0 | 12 | 0 |
| −0.10 to −0.01 | 4 | 0 | 2 | 0 |
| −0.20 to −0.11 | 1 | 0 | 4 | 0 |
| −0.30 to −0.21 | 0 | 0 | 2 | 0 |
| −0.40 to −0.31 | 3 | 0 | 1 | 1 |
| −0.50 to −0.41 | 1 | 1 | 3 | 3 |
| −0.60 to −0.51 | 0 | 0 | | |
| −0.70 to −0.61 | 1 | 1 | | |
| Total | 30 | 3 | 30 | 4 |
| Mean $r$ | +0.006 | −0.25 | −0.04 | −0.425 |
| Mean $\lvert r \rvert$ | 0.173 | 0.483 | 0.153 | 0.425 |

Column 1. Values of correlation coefficient ($r$).

Column 2. Frequencies of correlation coefficients involving interviewers' ratings.

Column 3. Frequencies of correlation coefficients in Column 2 which are at least three times their probable errors.

Column 4. Frequencies of correlation coefficients involving examiners' ratings.

Column 5. Frequencies of correlation coefficients in Column 4 which are at least three times their probable errors.

based upon impressions gained during the test. That the interviewers' ratings correlated as highly as they did with final scores, however, is an indication of a certain validity in the impressions gained during an interview, as to the general intelligence of these subjects.

Interviewers' and examiners' ratings correlated with each other in a sample of 141 consecutive records, in all types of work, gave $r = +0.33 \pm 0.05$.

In the year sample, the correlations performed were of scores in the single tests, final scores, age, and years of schooling, with the standardized foremen's ratings. All of the groups of unskilled workers were used for these correlations, and some of the semi-skilled. As in the six months sample, the numbers in these groups vary, due to the fact that in every test there were some individuals who were unable to score.

The results of these correlations are presented in table 4. Again most of the coefficients are very small, and the number of reliable coefficients has decreased. The range is from $r = -0.39$ to $r = +0.55$; the mean is $+0.045$, and the mean of the absolute values is 0.129.

In spite of the fact that these coefficients were so low, an attempt was made to secure higher ones by partial correlation, and by the weighting of the separate tests in the formation of a new final score. Cumulative correlation, as described by Chapman,[8] was used. The groups to which the process was applied were not those described for the year sample, but combinations of them, based upon such similarities as were found in the correlations of the separate tests with foremen's ratings. Six factory groups were thus formed, numbering from 122 to 390 subjects.

The results of the cumulative correlation were not significant. From 3 to 7 single tests and measures were combined for each group to form a new final score, depending on whether or not the calculation showed that they should be included, yet the resulting increase in the size of the coefficient was very little. This increase, i.e., the difference between the coeffici-

TABLE 4

*Correlations of employment measures with factory criteria of success*

Year sample; twenty-three occupational groups. Number of subjects, 20 to 207.

| 1 | 2 | 3 |
|---|---|---|
| +0.50 to +0.59 | 1 | 1 |
| +0.40 to +0.49 | 1 | 1 |
| +0.30 to +0.39 | 4 | 4 |
| +0.20 to +0.29 | 24 | 5 |
| +0.10 to +0.19 | 55 | 1 |
| +0.00 to +0.09 | 68 | 0 |
| −0.10 to −0.01 | 34 | 0 |
| −0.20 to −0.11 | 31 | 2 |
| −0.30 to −0.21 | 9 | 3 |
| −0.40 to −0.31 | 3 | 2 |
| Total..... | 230 | 19 |
| Mean $r$..... | 0.045 | 0.108 |
| Mean $\lvert r \rvert$ ..... | 0.129 | 0.292 |

Column 1. Values of correlation coefficient ($r$).

Column 2. Frequencies of correlation coefficients.

Column 3. Frequencies of the correlation coefficients in Column 2 which are at least three times their probable errors.

[8] Chapman, J. Crosby. Cumulative Correlation. Journal of Experimental Psychology, 1922, Vol. 5, 263-269.

ent of correlation of the new score with foremen's ratings and the coefficient of the best of the single tests, for each of the six groups, was as follows: 0.02, 0.02, 0.03, 0.05, 0.07, 0.10. Such changes are too small to be of value.

*3. Termination percentages*

In the year sample length of service and earnings were not used as measures of success, but terminations were. The treatment, which was much simpler than correlation, is described in the following paragraphs, and illustrated in the accompanying figure.

It will be recalled that the year sample covered all hirings from December 1, 1923, to December 1, 1924. In each of the occupational subdivisions of this sample except the clerical ones, the percentage of persons in the group who terminated from the employ of the company for any reason other than lack of work, prior to March 1, 1925, was obtained. Next the records were arranged in order according to the final scores in the test, and the percentage of termination of the subjects in each ten-point score interval was calculated. The percentages fluctuated, or tended to increase or to decrease with the changing scores. If for any group it was possible to mark off a section of the scale for which the average termination was less than for the group as a whole, this section was called a preferred range of scores. The preferred range, with non-preferred ranges above, below, or both above and below it, might occur in any part of the scale.

In twenty of the twenty-nine groups this process did not yield significant results, the preferred ranges showing termination averages which were only slightly (3 to 7 per cent) lower than those of the whole group. In the remaining nine groups, however, preferred ranges were found in which the termination was from 9 to 18 per cent lower than for all subjects in the group. These differences are fairly reliable.

Figure 1 shows the nine occupations. The final test scores, ranging from 60 to 180, are arranged at the top of the chart. The heavy horizontal lines indicate the preferred range of scores for each occupation; the dotted lines give the non-preferred range. Figures below the line refer to the number of persons who scored in the particular section of the scale; figures above the line give the percentage of terminations in that section. To the right of the chart, the figures under N are the number of employees in each group, those under T the percentage of terminations for the group as a whole. The termination percentage in the preferred range should always be compared with that of the whole group.

Two interesting observations with regard to the test score distributions and the preferred ranges in the various occupations are illustrated in this chart, and would be still more strikingly shown in a chart representing all of the groups. In the first place, the range of scores of the people actually hired into any occupation is surprisingly wide. In some of the groups almost the entire intelligence range is represented in a single occupation, from those who make the lowest scores, to those whose test performance compares with that of individuals capable of high school or college work. Secondly, the position of the preferred

range varies so much for the different occupations that the incoming population of the factory, even if placed selectively in certain occupations, according to such ranges as these, would as a whole still cover the full scale of scores.

It is interesting also to note that a treatment of the foremen's ratings which is comparable to this simple use of terminations frequently gives agreement in the preferred ranges. If in each group the employees who were rated by their foremen above a given point in the scale are assumed to be the best workers, then the percentage of best workers found in the different ten-point sections of the scale can be

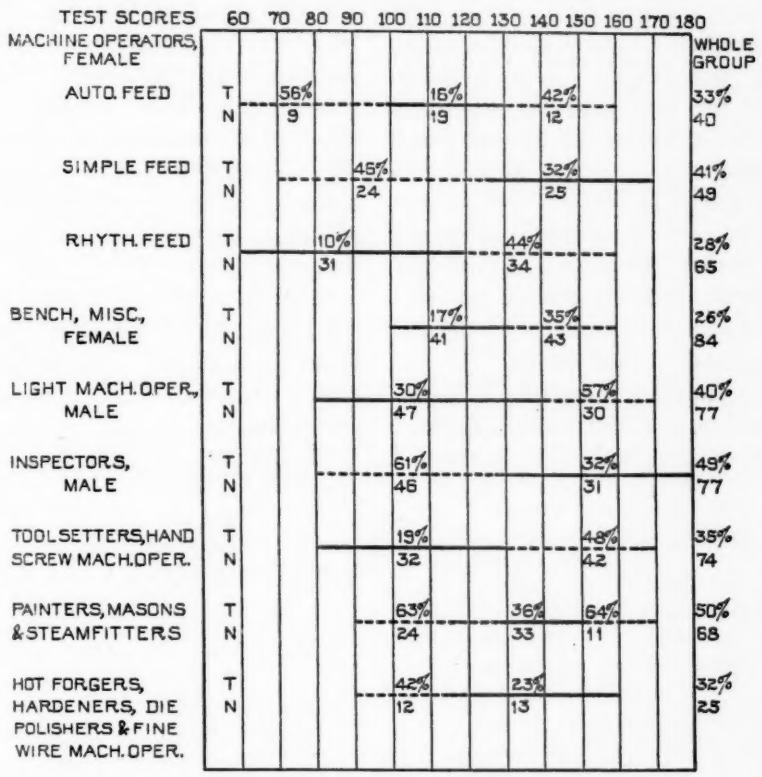
TEST SCORES 60 70 80 90 100 110 120 130 140 150 160 170 180
MACHINE OPERATORS, FEMALE
WHOLE GROUP
AUTO. FEED T 56% 16% 42% 33%
N 9 19 12 40
SIMPLE FEED T 45% 32% 41%
N 24 25 49
RHYTH. FEED T 10% 44% 28%
N 31 34 65
BENCH, MISC., FEMALE T 17% 35% 26%
N 41 43 84
LIGHT MACH. OPER., MALE T 30% 57% 40%
N 47 30 77
INSPECTORS, MALE T 61% 32% 49%
N 46 31 77
TOOL SETTERS, HAND SCREW MACH. OPER. T 19% 48% 35%
N 32 42 74
PAINTERS, MASONS & STEAMFITTERS T 63% 36% 64% 50%
N 24 33 11 68
HOT FORGERS, HARDENERS, DIE POLISHERS & FINE WIRE MACH. OPER. T 42% 23% 32%
N 12 13 25

FIG. 1. PREFERRED SCORE RANGES BASED ON TERMINATION

N = number of individuals. T = per cent terminated. Final test scores range from 60 to 180. Heavy horizontal lines indicate preferred score ranges. The chart is to be read as follows: Thirty-three per cent of the group of 40 female employees operating automatically fed machines had terminated by a given date. The range of final test scores for the group was 60 to 160, but between the scores of 100 and 133 only 16 per cent of 19 individuals terminated. Since this is distinctly lower than the termination for the whole group, the range from 100 to 133 is called a preferred range for this occupation. Similarly for the other groups.

studied in the manner described above, yielding preferred ranges in quality, instead of termination. When this is done, the quality preferred ranges may agree with the termination ranges, they may disagree, or they may partially overlap. In twelve of the groups of the year sample the ranges overlapped; for the remaining seventeen groups they agreed in thirteen cases and disagreed in four. In the nine groups shown in the chart, three termination preferred ranges overlapped with quality; one preferred range for quality did not agree with the preferred range for termination; and six showed complete agreement.

These results are essentially inconclusive as regards any use to be made of them in employment, but in view of the consideration that the groups of subjects were still heterogeneous as to type of work, that further investigation remained to be done on the validity of scores in the separate tests and age and schooling, and that measures of success were still known to be subject to error, the results were considered suggestive. It was thought that further attention to these points was necessary before any decision could be reached as to the value of intelligence tests in the selection of factory employees.

Later articles will present the developments in the investigation which have taken place in another year of study, and which lead to much more usable findings.

(*Manuscript received October 28, 1926.*)

# News Notes

## REPORT OF ANNUAL MEETING OF PERSONNEL RESEARCH FEDERATION

The second annual business meeting of the Personnel Research Federation since its incorporation in 1925, was held in the office of the Federation, 40 West Fortieth Street, New York, on October 8th and 9th, 1926.

Since the previous annual meeting, 16 new organizations had been added to the membership, making 44 corporate members; and individual membership had increased to 75, making the total membership 119. The Register of Approved Organizations (roll of corporate members) as submitted by the Administrative Board, was approved as follows:

*Business Organizations* (9)
- American Telephone and Telegraph Company
- Cudahy Brothers Company
- Dennison Manufacturing Company
- Eastman Kodak Company
- Industrial Relations Counselors, Inc.
- Scovill Manufacturing Company
- Walworth Company
- Western Electric Company
- White Motor Company

*Government Agencies* (5)
- U. S. Bureau of Labor Statistics
- U. S. Bureau of Mines
- U. S. Public Health Service
- U. S. Civil Service Commission
- Federal Board for Vocational Education

*Educational Institutions* (22)
- Bryn Mawr College, Carola Woerishoffer Department of Social Research
- The Women's College in Brown University
- Carnegie Institute of Technology
- Columbia University
- Dartmouth College
- Harvard University, Bureau of Vocational Guidance
- Harvard University, Graduate School of Business
- Massachusetts Institute of Technology, Division of Industrial Coöperation and Research
- New York University, School of Commerce, Accounts and Finance
- Northwestern University
- Purdue University
- University of Chicago, School of Commerce and Administration
- University of Cincinnati, School of Household Administration
- University of Michigan, School of Business Administration
- University of North Carolina
- Oberlin College
- University of Pennsylvania, Wharton School of Commerce and Finance
- University of Pittsburgh, Research Bureau for Retail Training
- Stanford University
- Syracuse University, School of Citizenship and Public Affairs
- Wellesley College
- Yale University, Department of Industrial Engineering

*Other Organizations* (8)
- National Research Council
- Engineering Foundation
- American Federation of Labor
- National Committee for Mental Hygiene
- Bureau of Vocational Information
- Vocational Service for Juniors
- National Council of Y. M. C. A.'s of U. S., Personnel Division
- Chi Omega

The Treasurer's Report was presented and has since been audited by Haskins and Sells.

Mrs. Mary H. S. Hayes, of the Vocational Service for Juniors, Mr. L. J. O'Rourke, of the U. S. Civil Service Commission, and Mr. Hugh Frayne, of the American Federation of Labor, were elected members of the Administrative Board for a three-year term; and Miss Dorothy Sells, of Bryn Mawr College, was elected for two years to fill the unexpired term of Miss Emma Hirth.

A report on the history of the Personnel Research Federation, prepared at the request of the officers by Mr. G. A. Bowers, was distributed. This has been made available to corporate members as Service Bulletin, Vol. 2, No. 2.

It was voted to amend Article IV of the Constitution to read as follows:

"ARTICLE IV, DUES, Section 1. The dues of Corporate Members shall be *$100 per annum* payable as the By-Laws may provide. Total or partial exemption from payment of dues may be granted, however, by three-fourths vote of the Administrative Board, to corporate members representing governmental organizations or other institutions of such character or in such situation that the payment of such dues would be illegal, unduly onerous or for other substantial reason inadvisable."

The budget for the year was referred to the new Administrative Board.

*Program for Coming Year*

Director W. V. Bingham told of the activities of the Federation during the year, in organizing conferences, publishing the JOURNAL OF PERSONNEL RESEARCH, preparing and publishing a research manual, "Procedures in Employment Psychology," consulting with members, and facilitating investigations through exchange of technical information, bibliographies, forms and other aids in research. He offered a program of work for the coming year, with recommendations which in brief are as follows:

1. That first emphasis be placed on our functions as a coördinating agency and a clearing-house of research information, with further development of the JOURNAL OF PERSONNEL RESEARCH as a means to this end.
2. That the carrying forward of major original investigations be definitely recognized as the function of the members of the Federation, while the central office conserves its time and resources for its primary function as a clearing-house of research information and a coördinating center.
3. That the staff should use its influence to encourage investigators to work over into more readily understandable and usable form the results of their technical researches, making them available, not only to technical specialists, but also to labor leaders and business executives who are faced by the practical issues of personal adjustments and the need for sound workable policies and procedures in dealing with people at work.
4. That the Federation should aim to further the movement for getting new bureaus or institutes of research established by making known through the JOURNAL the need for such centers, with vivid illustrations of what some of our member organizations are accomplishing.
5. That the Federation emphasize to its constituency its primary interest in *research* in the personnel field rather than in details of organization and administrative procedure in personnel offices; and in particular that educational questions of student admissions, classification and educational guidance be referred to the strictly educational agencies, so that the Federation may concern itself more with the furtherance of research on problems of importance to people at work.

"This fifth recommendation," said Dr. Bingham, "does not contemplate any lessening of contacts between the Federation and the personnel research workers in the colleges. The contributions which our collegiate members are making to methods of individual appraisal and other aspects of personnel management are needed wherever jobs and workers are to be

brought together. Nor shall we be any the less ready to transmit to the colleges information about industrial investigations of occupational opportunities and requirements.

"Within the fields of business and industry, too, a clear delimitation of our zone of operations is needed. We are interested in the effects of management devices on the attitude and satisfactions of the individual worker, but are not concerned with the improvement of such devices simply as a means to profits. Such topics as pension plans, group insurance, employee stock ownership, and vacations with pay, are vital to many executives, but only the human aspects of these problems are our concern. Their business and economic aspects are being studied by the management groups, helped by the statisticians and the economists. So, also, are many problems in labor relations, joint agreements, bases of wage determination, and employee participation in plans for increasing output. We are interested, for example, in studies of the anxiety and dissatisfactions of workers caused by the spectre of possible unemployment in an unstabilized industry; or of the satisfactions which come with confident assurance of steady work. But it is outside our province to promote researches into the best ways by which business and manufacture may be stabilized. Research on the measurement of fatigue and the effects of rest periods is very much within our province; likewise the mental and physical effects of monotonous, repetitive work on different types of workers.

"The psychological and physiological problems of the adjustment of workers and their work are our distinct field in contrast to the strictly economic problems. Certain it is that no problem of industrial personnel should have priority on our program which does not obviously and directly affect the worker's well-being and satisfaction in his work. Such a criterion brings into prominence research on procedures in selection, placement, training, and promotion. It has been urged that a series of major researches on the selection and development of supervisory and executive personnel would lead to better management, better training and supervision, increased output, and greater satisfaction among both employees and supervisors.

"Research in employment procedures and means of individual appraisal interests a large proportion of our present industrial membership. Next comes research in problems of learning and training; then, problems of personal and group relationships between management and workers.

"Whether these or other topics of investigation are foremost, the Federation stands for the furtherance of their solution through use of scientific methods—the method of the experimentalist or the method of the statistician. We do not look for solutions through the mere pooling of opinion.

"We recognize that a long-time program will look toward the furtherance of research in the basic sciences which underlie sound personnel practice, particularly economics, psychology, psychiatry and physiology. Advances here must await the fundamental investigations of specialists. The several scientific associations and such bodies as the National Research Council and the Social Science Research Council are responsible for advancing these sciences. The Personnel Research Federation has a special responsibility for encouraging research which calls for the coöperation of these sciences with business and industry."

### *Scheduled Meetings*

The following meetings were scheduled:

(a) One meeting in New York, January 20, 21 and 22, will bring together research workers and leaders of industrial personnel prcatice with the college placement secretaries.

(b) A spring meeting in Washington, on Fact Finding in Industrial Relations, it is hoped, will be as valuable to our Labor members and as far-reaching in its after-effects as our last Washington conference proved to be.

(c) The annual meeting a year hence will come a little later in October, and should be a full two-day session, to allow presentation of the most significant re-

searches which members have made during the year.

*Committees*

Designation of four committees was authorized:

(1) On Methods of Research in Industrial Relations: Wesley C. Mitchell, G. A. Bowers, John R. Commons, H. S. Person, Florence C. Thorne, Clark Wissler, R. S. Woodworth, Mary Van Kleeck.

(2) On Library Classification of Personnel Research Literature: Chairman, Miss L. H. Morley, Industrial Relations Counselors, Inc., 165 Broadway, New York.

(3) On Research Projects: Chairman, Dr. C. S. Yoakum, University of Michigan.

(4) On Finance: Mr. Donald Scott, Chairman, Mr. Francis H. Sisson, Mr. H. A. Hopf.

The new Administrative Board elected officers for the year as follows:

Vice-Presidents: William Green, Alfred D. Flinn, Donald Scott.

Secretary: H. H. Carey.

Treasurer: Francis H. Sisson.

Assistant Treasurer: Welch Walker.

Director: W. V. Bingham.

Mr. G. A. Bowers was added to the Board in place of Col. R. I. Rees, resigned.

As a matter of record, mention is here made of the excellent sessions on "Increasing Labor Stability" which were held jointly with the American Statistical Association on the afternoon and evening of October 8. The program for these meetings appeared in the JOURNAL OF PERSONNEL RESEARCH for September, and the main papers will be published in the JOURNAL.

## CURRENT RESEARCH AMONG MEMBER ORGANIZATIONS

This summary of current research among member organizations was prepared by Dr. Paul S. Achilles for the annual business meeting of the Personnel Research Federation, October 8th and 9th, 1926:

If time permitted we should like to present full accounts of the researches being conducted by each organization represented in the Federation. As this is impossible, we have attempted a summary of the reports which representatives of these organizations have kindly submitted.

*Industrial Group*

First, in the industrial group. In a recent article in the *Management Review* Dr. Charters states that the general emphasis in personnel research has shifted from selection to training. Among our own industrial members, however, both of these problems seem to be receiving about equal attention. Thus Mr. Coonley reports that the *Walworth Company* is confining its attention to two studies: 1. Tests for applicants for supervisory positions. 2. Methods of instruction for salesmen and executives.

Similarly, the *White Motor Company* is about to take up employment tests (especially for automobile repair mechanics), and is endeavoring to improve the selection of salesmen through statistical studies of the personal history items on application blanks. Attention is also being devoted to the training of apprentices. A general study of promotion and the relative responsibility of different supervisory and executive positions has been begun by studying the progress of all college men in the organization. Some research in the sense of gathering information on group issurance, employee representation, and allied subjects is also going forward.

In both the *Scovill Manufacturing Company* and the *Eastman Kodak Company*, the research work reported is primarily upon methods of selecting factory personnel. An excellent research program has been carefully followed at the Scovill plant covering test scores and other records on all newly hired employees over a period of two years. It was reported briefly in the News Notes of the JOURNAL OF PERSONNEL RESEARCH for last August. The Kodak Company has only recently become a member of the Federation, but has long been experimenting with and successfully using selective tests for factory and office occupations. We hope for a full report of its present activities soon.

*The Cudahy Brothers Company* has made rapid strides in its personnel program within the past year. Its president, Mr. Cudahy, has special interest in employee representation which is now being handled through a Works Council. Under the direc-

tion of Mr. Fosnes of the Analytical Department, work has been undertaken chiefly upon methods of compensation, job analysis and improvement of personnel records. In regard to their compensation plan, Mr. Fosnes writes: "This plan deviates from the usual piece or time rate system in that it covers the total time that the employee works each day, permitting him to earn the same premium on the variety of operations which he performs every day. As the standards of performance are based upon the time required for the average skilled worker to perform that particular task, we have eliminated the necessity for changing so-called rates or standards and the consequent dissatisfaction to workers." He says further, "while the job analysis records, personnel tests and the present premium plan of compensation have all been developed within the past year, we have been able to notice some considerable reduction in our labor turnover. The greater the effort being made in the various departments in handling the situation, the greater the per cent reduction in our turnover." I had the pleasure of visiting this plant last spring and may add that the problems which Mr. Fosnes meets in the meat packing business require all the tact and technique that a personnel man can muster.

The *Dennison Manufacturing Company* has made a very thorough study of its supervisory and executive positions with a view both to better methods of training and to better bases for salary scales.

The *American Telephone and Telegraph Company* and the *Western Electric Company* are rather modest about their researches. The former has reported work on Health Courses for Women Employees and Employee Savings Plans, and a study of their needs for college graduates. The Western Electric Company shares to some extent in these studies, and is also working on methods of selection for certain factory jobs. Probably the most carefully prepared job specifications yet made anywhere, are those upon which the Chesapeake and Ohio Division of the Bell system has been working.

*College Research Departments*

Closely allied to these activities of our industrial members are the studies being made by the research departments of some of our university members and federal agencies. Their research is more often of the statistical than of the experimental variety. For example, Miss Bezanson reports the following work in progress in the Industrial Research Department of the *Wharton School* at the *University of Pennsylvania:*

(1) Continuous monthly reporting of turnover for
  (a) 20 general manufacturing plants
  (b) 55 metal manufacturing plants
  (c) Metal plants in New York, Detroit and Milwaukee
(2) Continuous monthly reporting of absenteeism
  (a) In metal plants
  (b) In four textile plants
(3) A series of studies in 55 metal plants, dealing with the results secured and the degree of success attained by various personnel activities.
(4) Continuous monthly analysis of accidents by occupations and industries.
(5) Study of tapestry weavers' earnings.
(6) A study of the demand for labor as shown by the analysis of the monthly "help wanted" advertising in Philadelphia, by industry and major occupations.

At the *Massachusetts Institute of Technology*, the Division of Industrial Coöperation and Research, at *Bryn Mawr*, the Carola Woerishoffer Department of Social Research, and at *Yale*, the Department of Industrial Engineering, there are similar opportunities and plans but as yet these institutions have not progressed as far as the University of Pennsylvania in developing coöperative research with industrial firms. Professors Hastings and Haggard at Yale are now seeking funds to carry on special studies in industrial hygiene.

At the *University of Pittsburgh*, the

Research Bureau for Retail Training has the hearty coöperation and support of twenty Pittsburgh retail stores. Its impressive schedule of studies includes many pertaining to personnel, such as causes of labor turnover in department stores, uses of intelligence tests in the selection of office employees, trade tests for clerical ability, and many other studies. The full list was published in the JOURNAL OF PERSONNEL RESEARCH last March.

We hope to receive in the near future from *Dartmouth* a copy of their recently completed analysis of the department store as a vocation for college trained men, and also to hear from other business schools in our group such as *Harvard*, *Columbia*, *Chicago*, and *New York University* regarding their special activities relating to personnel.

The following excerpts from a memorandum prepared by Dr. C. S. Yoakum show how actively personnel research is progressing. "The continuation of the work begun under the auspices of the Committee on Migrations of the National Research Council has resulted in a bibliography on Analysis of Personality, now in press. The study of tact by Dr. Manson is still in progress and Miss Brown's work of studying traits ascribed to different nationalities is in completed manuscript form.

"The National Federation of Business and Professional Women's Clubs at their convention in Des Moines last summer accepted the offer of the Bureau of Business Research at the University of Michigan to coöperate in an occupational survey of business and professional women. The study will be based upon a questionnaire filled out by members of the National Federation, and the returns will be analyzed and compiled at the University of Michigan. Since the Federation's membership is in the vicinity of 47,000, the study should make available valuable data on the work of business and professional women.

"The questionnaire is divided into three parts. The first, headed Occupational History, is designed to give information on marital status, dependency, education and earnings as well as on job sequence. The second section attempts to discover personality requirements for the different occupations; and finally, a study of occupational interests has been included.

"A survey on so comprehensive a scale should not only provide accurate vocational information for young women who have not yet found their places in business and the professions, but it will also throw light on the problems of dependency, earnings, training, and promotions, as well as the highly controversial subjects of combining marriage and careers, and the relative success of collegiate and non-collegiate women. Questionnaires are soon to be ready for distribution to members of the Federation, and the study should be well under way by the end of 1926. Drs. Elliot and Manson are in immediate charge of the investigation for the university.

"Professor Z. C. Dickinson has begun an extensive research on suggestion systems in industrial organizations. The plan of his work contemplates a detailed study of such systems in companies where sufficient records are kept to indicate the fertility of workmen in making such suggestions and where companies have undertaken to determine the value of suggestions accepted. A great many other points have already appeared in the course of the study. It is expected that at least two more years will be required to cover the field with any degree of thoroughness.

"Other investigations include a study of the work histories of approximately 150 students who specialized in accounting. The years 1916 to 1925 inclusive have been used in the study. Professor Schmalz, Assistant Director of the Bureau of Business Research, is consulting member of the personnel committee of the American Dry Goods Association in the direction of a study on cost of personnel department organizations for department stores of various sizes. A preliminary survey is in progress on the subject of the nature and systems of promotions used in business and industrial concerns.

"The Department of Psychology at the University is working on special problems in the selection and training of employees for certain industrial concerns in Detroit. Under the direction of Professor C. S.

Berry of the School of Education a committee is formulating plans for the establishment of a psychological clinic at the University. These plans contemplate the use of all types of specialists in personnel work in connection with special cases, both inside and outside the University."

*Governmental Agencies*

Turning to the governmental agencies in our membership, we have just received from Commissioner Stewart a list of the extensive studies of wages and hours of labor in different industries, made by the *United States Bureau of Labor Statistics*. It will be published shortly in the JOURNAL OF PERSONNEL RESEARCH.

Dr. R. R. Sayers of the *United States Bureau of Mines* reports continued studies of safety, health, and causes of accidents in the mineral industries, physiological effects of high temperature and humidity, effects of coal dust on health of miners, and studies of toxic gases. An interesting point in connection with the study of gases is that the substitution of helium for nitrogen in the air breathed by compressed-air workers will make possible the extension of depth and time in diving operations and also the prevention of caisson disease among tunnel and caisson workers.

For an excellent piece of research on the problem of selection, I would refer you to the study of post office employees made by Dr. L. J. O'Rourke of the *United States Civil Service Commission*. An account of it was published in the February and March issues of the JOURNAL OF PERSONNEL RESEARCH, Part 1 dealing with the procedure in effecting the improvements in selection, and Part 2 with the remarkable money savings which resulted. It is a well-rounded study worthy of citation wherever arguments for undertaking personnel research are needed.

We have no recent report from the *United States Public Health Service*, but the nature of its activities and their general relation to problems of health in industry are known.

The *Federal Board for Vocational Education* has under way the development of a course for training conference leaders to conduct foremen's conferences largely on the human relations side of their work, and also the development of graduate summer school courses which deal with the principles and practices of personnel management as they apply in the work of the administrator, the supervisor, and the vocational instructor. Mr. C. R. Allen heads the research of this board.

This completes our record of activities of industrial firms, industrial research departments in universities, and governmental agencies.

*American Federation of Labor*

Next in order should be the research work of the *American Federation of Labor*. It has followed much the same lines reported last year. Mr. Morrison writes: "We have continued to gather information on labor banks and have compiled a summary from their quarterly statements, a copy of which is on exhibit. A revision of this summary for the second half year is now in the hands of the printer.

"We have been gathering information on company unions and investments for workers.

"We have been adding to our information on the development of coöperative relations between employers and employees.

"We have prepared and published two charts, one giving the benefit services of standard national and international unions in 1925, and another the vacation provisions secured through trade union agreements.

"The American Federation of Labor Committee on Education is continuing its study of apprenticeship training and has also been gathering information on industrial hygiene. The Committee has published a pamphlet containing sixteen rules of health for the service of the trade union groups.

"We have paid considerable attention during the past year to materials that would help our organizers to state the case for our trade unions. The problem of persuading workers to join a trade union requires just as much study and thought as any other problem in influencing the conduct of others. Perhaps the Personnel

Research Federation will be able to help us with this problem."

*Independent Organizations*

The work of our other members in the group of independent or non-profiting associations is indicative of the ramifications of personnel research. The *Bureau of Vocational Information* is just completing and sending to press a careful study of the work and opportunities for private secretaries based on a nation-wide survey. The *Vocational Service for Juniors* is making follow-up studies of the careers of high school students who received scholarship aid, to check up on the factors which determined the selection of those students for scholarships. The *Personnel Division of the Y. M. C. A.* is applying scientific procedures to the selection of its Secretaries, of whom there are over 5000 and with whom many hundred thousand of our boys and young men in high schools, colleges, industries, and the army and navy are in contact. Read the interesting account of the research projects under way in this Division which was sent us by Mr. Pence and published in the August number of the JOURNAL. It is a program that might well be followed by any large organization in studying its personnel for supervisory positions. With generous financial support from the Commonwealth Fund of New York, the *National Committee for Mental Hygiene* has a splendid program of research and training in the field of mental hygiene. The most significant provision in this program is for the establishment of an Institute for Child Guidance making possible further research on the causes and methods of treatment of behavior problems, and providing facilities for the training of psychiatrists, psychologists and psychiatric social workers. Dr. F. W. Williams can tell you more of this, and of the advisory services to colleges that are contemplating mental hygiene provisions for their students. The *Engineering Foundation*, while not active in research itself, is our constant ally in arousing the interest of engineers in the Personnel Research Federation and in human engineering. Finally the *National Research Council* has been sponsor for many projects relating to personnel research extending from tests for taxi drivers to the scientific study of human migrations.

*Universities*

Our largest group of members is composed of colleges and universities, wherein the primary interests are in problems of psychological research on means of appraisal of human abilities. They are also concerned with practical problems of student adjustment, including personal development, educational and vocational guidance, and placement. We attempted an inventory of research on these problems covering our own members and some 300 additional institutions and organizations. This inventory was issued as a Service Bulletin last February. Another stock-taking of such research came last May when the conference on educational personnel research and student guidance was held at the University of Minnesota. An account of this conference appeared in the August issue of the JOURNAL and is now available as No. 4 of our Reprint and Circular Series. Almost every number of the JOURNAL contains News Notes of the activities of one or more of our college and university members; since last October we have thus published reports from the following: The Women's College in Brown University, Carnegie Institute of Technology, Columbia University, Dartmouth College, Harvard University Bureau of Vocational Guidance, New York University, University of Chicago, Stanford University, Syracuse University, Wellesley College and Yale University. In view of the above, and of the fact that on January 20, 21, and 22, 1927, we are to hold a joint conference here in New York with the National Association of Appointment Secretaries and related associations devoted to personnel problems of common interest to both college and industrial personnel workers, I shall not take time here for mention of specific researches. May I, instead, quote from a letter from President Walter Dill Scott of Northwestern, as typical of the personnel activities of our educational members.

"The Personnel Office at Northwestern University is organized as a staff office and has, in addition to a Director, six persons regularly employed in its work. This department is primarily a service department but devotes a great deal of time to research. Practically all of the work is experimental and involves a certain amount of research study.

"Among the research studies now in progress may be mentioned first the work with tests. We are giving the American Council test to several hundred freshmen on the Evanston campus each fall and correlating with scholarship reports. We are also interested in the development of placement tests in mathematics and language which are utilized every year. In conference with the Dean's Office, we are now engaged in finding the best means for the selection of students to be admitted to college. We are attempting to improve our methods of interviewing students, especially with reference to the detection of abnormal conditions. We are making statistical studies in time distribution with special reference to outside work done to earn living expenses. Special studies of various college classes are constantly being made in order to obtain correct information on such matters as geographical distribution, parentage, significance of high school standings and the like.

"Special research problems for the present year have not been formulated yet, but we can furnish information on these studies in the course of the next month if this is desired."

There is the picture, necessarily sketchy, but the things that stand out in it are the three fundamental points of personnel procedure. They are easily remembered as the three "A's":

> Analyzing the work to be done,
> Appraising the people to do it,
> Adjusting the one to the other.

With these points in mind it seems to me there is ample opportunity for helpful exchange of research data between our member organizations, for coördination of studies and standardization of methods, and for concentration on a few of the outstanding problems which most organizations have in common.

### INFORMATION FOR CONTRIBUTORS

An author's abstract or summary should appear on the first page of the manuscript.

References to literature should observe strictly the following standard practice: (a) If a book, the name (including initials) of the author or authors, the title of the book, and the city and year of publication; (b) if an article in a periodical, the name (including initials) of the author or authors, the title of the article, the name of the journal, the year, the volume number and the first and last pages.

Examples:

Chapman, J. C., *Trade Tests*. New York, 1921.

Thurstone, L. L., *The Intelligence of Policemen*. Journal of Personnel Research, 1922, Vol. 1, 64–74.

All figures for illustration should be submitted in such form as to admit of photographic reproduction. Curves and necessary reference lines should be drawn in India ink on white paper. Background lines in blue will not reproduce; red, yellow, and green will reproduce black. Numerals and lettering should be made clear and large in order to be legible when reduced in the plate.

All footnotes and citations should be assembled at the end of the manuscript and numbered consecutively.

Tables and figures should likewise be grouped at the end of the manuscript and numbered consecutively.

Section headings should be inserted at suitable places to break the monotony of solid type.

Brevity is a virtue in manuscripts offered to the Journal of Personnel Research. Please leave out statements or sections which do not contribute essentially to the point of the article.

# Book Reviews

## PRINCIPLES OF EMPLOYMENT PSYCHOLOGY

*By Harold Ernest Burtt. Boston: Houghton Mifflin Company, 1926. Pp. 568*

REVIEWED BY MAX FREYD

This volume is one which every personnel research man will want to own. It is written by a confirmed scientist. It makes no exaggerated claims for the possibilities of employment tests, but discusses them in a common-sense way. The illustrative material is always good and always interesting. An excellent bibliography of 692 titles is given at the end of the volume.

People who read books on employment psychology can be divided roughly into two groups. One group consists of technicians, —research workers in school and industry, college instructors, and advanced students. These people want substantial informative works. In particular, there are three types of books that they can use; one which outlines the scientific method in vocational selection, one which gives the results of completed investigations in employment psychology, and one which makes available various tests and forms which a research worker may want to use in conducting an investigation.

The other group of readers consists of executives who want to know what psychological tests and other scientific selection methods can do for their organizations; plus some others to whom anything dealing with choice of occupation is meat and drink. They want a book which tells them in simple and clear language the outstanding facts of research in vocational selection.

Dr. Burtt has attempted to reach both classes of readers in one volume. In his preface he says, "Effort is made, on the one hand, to give a fairly comprehensive account of the principles involved for the use of students preparing for practical psychological work in industry, and on the other hand, to avoid a discussion that is too technical for the reader without a psychological background." From another point of view such an attempt is just as likely to result in a book which is not technical enough for the research worker and too technical for sustained reading by the business executive. Instead of trying to strike an exact balance the author might have done better by addressing himself frankly to one class or the other. By making the processes seem too easy the volume is apt to encourage the dilletante to experiment with tests. Too much emphasis cannot be given to the necessity for a broad background of training and the exacting requirements of a scientific study in vocational selection.

The author's lack of precision in addressing himself to a particular audience is reflected in his lack of precision in organizing his material. The list of chapter headings will illustrate this point:

1. Introduction.
2. Psychology Gold Bricks.
3. History of Scientific Vocational Psychology.
4. Types of Mental Tests.
5. Mental Test Technique.
6. The Criterion.
7. The Subjects Used in Evaluating Tests.
8. Special Capacity Tests: Total Mental Situation.
9. Special Capacity Tests: The Mental Components of the Job.
10. Intelligence and Vocational Aptitude.
11. Interests in Employment Psychology.

12. Rating Scales.
13. Miscellaneous Determinants of Vocational Aptitude.
14. Trade Tests.
15. Job Analysis.
16. The Outlook for Employment Psychology.

Job analysis, which is fundamental in employment psychology, is placed near the end of the book. Mental test technique follows a chapter on types of mental tests. Other chapters on tests are scattered throughout the book. There are no chapters on statistical methods. A discussion of reliability is found in Chapter 5. Average deviation, standard deviation, and the normal probability curve are taken up in Chapter 6; correlation and critical scores in Chapter 8; and multiple and partial correlation in Chapter 9. In the appendix there are sections devoted to correlation, combining rankings with incomplete data, and the regression equation. An example of a man-to-man rating scale is found on page 332, and another of the same sort on page 420. The various pseudosciences are described in Chapter 2, but graphology is discussed as a pseudoscience on page 407.

While this arrangement of subject matter may have good pedagogical backing, it is apt to be confusing to the general reader.

Chapter 16 is a very good introduction to the subject to place in the hands of an industrial executive, and belongs near the front of the volume. It contains a statement regarding present trends in employment psychology, a list of organizations engaged in coöperative research, a discussion of the attitude of workers and management toward employment psychology, and the reasons why further research is necessary. The last few pages are devoted to the social implications of employment psychology.

## THE ORIENTATION OF COLLEGE FRESHMEN

*By Henry J. Doermann. Baltimore: The Williams & Wilkins Co., 1926. Pp. 162*

Reviewed by Grace E. Manson

This is a pioneer work in the field of college personnel service, and a very welcome one. Emphasis is thrown upon the orientation of the college freshman, but the needs of upperclassmen are necessarily touched upon. The viewpoint of the author is that of the experimentalist in education. He states problems, offers hypotheses, describes methods used, and summarizes conclusions. The style is clear-cut but somewhat "text-bookish" in organization and tone.

"Standardization characteristic of mass production in an industrial age, carried over into schools and colleges, has resulted all too frequently in placing emphasis on the mechanisms of education instead of on the individual." The shift must be back to the individual and his development. "Let the college, then, understand the freshman in order that the freshman, in turn, may understand himself."

The book is divided into three main parts; Part 1, Statement of the problem; Part 2, Current practice with respect to problems of orientation in representative American colleges; Part 3, A guidance program.

In Part 1 the author describes a number of problems the freshman meets. These may be educational, social, psychological or vocational in nature. He then turns about and faces the situation from the administrative point of view, and discusses large enrollments, qualifications of applicants, coöperation with secondary schools, freshman curriculum, teaching problems, and student activities. In the final chapter in this section the need for guidance is voiced.

Part 2 is particularly valuable. Here the author carefully reviews the literature and gives in detail methods used in various institutions to meet the freshman's needs. Topics discussed are processes of induction

into college, advising students during the first year, and orientation courses.

In Part 3 the author offers a plan for the organization of guidance service. He calls the organized service *personnel* service. He suggests that the executive officer of the guidance service be called Dean of Personnel, or Director of Personnel. On page 117 he gives an outline of guiding principles for the personnel service, on page 118 an outline of the activities of the personnel service. The three remaining chapters are given over to detailed plans for pre-registration guidance, guidance during the registration period, and guidance during the freshman year.

Organized personnel service is a new function of college and university. Its need is felt. College administrators and faculty are thinking about freshman problems in terms of their own schools. The type of personnel service will necessarily vary from institution to institution. There will be many debatable issues. We heartily recommend Dr. Doermann's book to those persons who are or should be thinking about the orientation of college freshmen.

# New Books

ALLEN, GRACE. *The Families Whence High Intelligence Springs.* Eugenics Record Office, Bulletin No. 25. Washington: Carnegie Institution, 1926. 39 p.

ASHLEY, SIR WILLIAM. *Business Economics.* New York: Longmans Green and Company, 1926. 79 p. $1.00.

BARNES, W. C. *Business in the Bible.* Philadelphia: Virginia Publishing Company, 1926. 86 p. $.50.

BINGHAM, W. V., AND FREYD, MAX. *Procedures in Employment Psychology.* Chicago: A. W. Shaw Company, 1926. 269 p. $3.00.

BLAKE, M. B. *Guidance for College Women.* New York: D. Appleton and Company, 1926. 303 p. $2.50.

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# Current Periodicals

*Industrial Management* for November, 1926, contains an unusual amount of reading matter for the personnel manager. Editorial notice is taken of the five-day week controversy, and quotations are given expressing the views of Ford, Green, Gary, and others. Unfortunately, these expressions are in the most general terms and it is apparent that we shall have to await the results of plans inaugurated at the Ford Motor Company and elsewhere.

Much has been written about the technique and importance of job analysis, but one does not often find a concise account of the methods of worker analysis. It is essential before experimenting with a scientific method of personnel selection to make a study of the worker (as well as the job) from the following standpoints:

1. Personal data
2. Personal history
3. Previous experience
4. Education and training
5. Physical characteristics
6. Social characteristics
7. Interests
8. Abilities

A discussion of such a worker analysis will be found in an article by Max Freyd ("Worker Analysis").

Dana S. Cole points out that the small factory must compete with the large factory not only for markets but for the requisite labor supply. Although the small factory is at a material disadvantage in this competition, it has the advantage that it can instill among its workers the feeling that they are working with the management rather than for it.

Herman Feldman's "The Essentials of a Plan for Rating Employees" is one more presentation of the advantages of a scientific rating system. He gives examples of graphic rating scales and shows their advantages over other types of scales. We quote his list of features of a scientific rating sheet:

"A. Choose qualities that are very directly related to the kind of work that the employee actually does.

"B. Limit the qualities to a small number.

"C. Endeavor to express the qualities selected in terms of how an employee actually handles a particular situation, rather than how much of a particular personal trait he seems to have.

"D. Avoid attempting to secure accurate judgments with regard to characteristics which the supervisor cannot really know.

"E. Clearly separate the estimates of the employee's past performance from the advice that may be requested with regard to the employee's future progress."

Calvin T. Ryan, who is Professor of Journalism and Director of Publicity at Iowa Wesleyan College, gives a popular but dependable account of the place of tests in industrial vocational selection, under the title "How Practical is Practical Psychology?"

Ralph E. Motley, of the Atlantic Refining Company, describes and illustrates the personnel record system in use in that firm in its bearings on the analysis of labor turnover.

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Writing on the "Social Psychology of Leadership" in the *Journal of the National Institute of Industrial Psychology* for October, F. C. Bartlett says,

"It is common to suppose that a leader forces his own way to the front, but as a matter of fact, which type comes uppermost at any time depends mainly upon the relationship of the group concerned to other groups. Wherever we find a complex group possessing an established culture and well-founded institutions, living under

settled and peaceful conditions, and relatively self-contained, there the institutional type of leader abounds. This is the case, for example, in an army in peace time, and in most sections of the modern Church, where theological discussion is not particularly active. When antagonisms arise between groups, and become bitter to the point of fighting, the dominant leader has the best chance. When there is much bargaining to be done between group and group, and disagreement stimulates discussion, the persuasive leader plays his part. The persuasive is in fact the political and administrative type of leadership. Probably the normal industrial organization of the modern world tends to favor the rise to power of the persuasive type, although the situation is at once changed when bitter group antagonisms burst through to more or less violent expression."

The article by R. M. Fox on "Psychology of the Workshop" is one which should be in the hands of every industrial executive. Its stimulating character may be gathered from these short extracts:

"It is now being recognized that no two people can be trained to act in precisely the same way without waste of energy. The quickest movements are often the most fatiguing. Sharp, angular movements, which seem to be the best, often do not allow for recovery of energy and for rhythm of stroke, which sweeping circular movements permit. To standardize the stroke of one man may increase the effort and reduce the efficiency of the rest. In the world of industry the same principles apply as in the larger world of life. The utilitarian school argued that society could be put together with a set of mechanical principles justified by abstract reason. Bentham even devised a model prison on these lines, and the method is really suitable for nothing else, though the factory run on 'scientific management' ideas often bears a striking resemblance to a jail. . . . .

"The National Institute, we are told, believes in teaching the operative to avoid bad habits of work and then leaving him to adjust himself to his task. One danger is that this elimination of bad habits may be carried out as rigidly as the older methods that are condemned. Where the Taylor expert instructed the worker what to do, the new industrial psychologist tells him what to avoid. . . . .

"But in considering monotonous work we must be careful to distinguish between the different types of mind. There are men to whom monotony is a pleasure, who will do anything to avoid the 'intolerable burden of thought;' there are others who turn to monotonous jobs as a relief after highly concentrated mental effort. What I have always found most irritating has been monotonous work that requires constant close attention because of speeding-up. To be kept at the point of extreme tension on work of a simple repetition character and not to be able to relax for a moment, means exhaustion and frayed nerves—the worker is like a dog at the end of a short chain, confined to a tiny radius, and always being pulled up with a jerk. I believe this evil is felt acutely by many. It is galling to have to fix eyes, mind, and muscle for hours on work that is not really sufficient to occupy the mind. I do not make the mistake of asserting that conscious revolt against monotony is general. This would be to repeat the blunder of those who wish to impose a uniform standard for everyone. But many who have reconciled themselves to it have done so at the expense of possibilities of development. . . . .

"Ugliness is a factor in industrial life mentioned more rarely than monotony. Yet it is very important. Industrial workers become so much inured to it that they are supposed not to mind. Probably not many do take conscious notice of the hideous rawness of industrial towns and plants. But surely a work room which is an eyesore intensifies monotony and weariness. During the air raids, in the early days of the war, I was working in a shop the windows of which were daubed with a dingy drab-colored paint to prevent the light shining through. The result was that even when the sun shone the room was dismal. We worked as if in a horribly depressing fog every day, and that did not make for better production or a better spirit in the workshop. And much of the ugliness has not even national emergency to excuse it."

The same issue contains articles on accidents in industry, on selection tests on the German railways, and on devising analytic tests for vocational selection.

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In *Harper's Magazine* for December an author who for obvious reasons prefers to remain anonymous, writes on the topic of "Managing the Boss." Scientific management, he says, has gone to bed-rock in the matter of machines, tools, materials, and methods. It has resulted in volumes on how to handle employees so as to get maximum results with minimum friction. But it has wholly neglected the technique of handling one's immediate superiors, in such a way as to increase the efficiency and smooth operation of the firm. The author describes the technique of handling the over-enthusiastic boss, the impetuous boss, the bully, the lazy boss, and the real leader. He writes with a twinkle in his eye, but one senses the underlying truth in his statements. His description of the timid boss will have a familiar ring to research workers:

"The most irritating type is the timid boss—he who is always afraid to take an important step. He encourages investigations and new ideas and takes an intelligent interest in their progress, but as the moment for final action arrives he hesitates. The time comes for a decision. The new formula (or machine, or method, or what not) proves better than the old: shall we adopt it? Then comes the endless procrastination. 'Let us get further information before deciding,' or, 'Let us wait and see what Mr. Jones thinks about it,' etc., etc., anything but, 'Let us make our final decision on this at once.' So a project hangs fire indefinitely, never put out of the way by final rejection, yet never put into operation.

"The only way to manage a boss of this kind is for the subordinate to supply the courage which his boss lacks. He must force the decision and take the responsibility on himself. The result of this is, if the new idea turns out well, the boss takes all the credit; if it fails, the subordinate gets the blame. However, one who is unwilling to face this situation is unworthy of a position of responsibility as boss-manager. The better type of timid boss often appreciates deeply an assistant who will supply a stock of courage for important decisions."

Other worth-while articles in the same issue are "The Problem of the Educated Woman," by R. Le Clerc Phillips, "Big Business on Trial," by Jesse Rainsford Sprague, and "Why College Men Fail in Business," in the humor section.

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For the personnel research worker, the outstanding feature of the *Journal of Applied Psychology* for September, 1926, is Edgerton and Paterson's tables for use in determining the significance of a proportion or of a difference in proportions. The tables reduce considerably the labor of calculation in solving the formula for the standard error of a proportion:

$$\sigma_p = \sqrt{\frac{pq}{n}}$$

Values of $\sigma_p$ to the third decimal place can be read off the tables for given values of $p$ from 0.01 to 0.99 by hundreths, and for given values of $n$ from 25 to one million. Values of $\sigma_p^2$, P.E.$_p$, and P.E.$_p^2$, are also given.

A measure of sociability is described by Gilliland and Burke. The measure consists of four photograph recognition tests and a questionnaire on social activities. When these measures were compared with ratings on sociability it was found that the questionnaire was by far the most valid part.

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An appraisal of incentive wage systems compared with day-work and piece-work systems appears in the *Harvard Business Review* for October, 1926. After showing that incentive methods of wage payments are in the minority in American shops, the author, Prof. T. H. Sanders, says,

"The net result is that day-work and piece-work cannot yet be bowed out of existence, and it is one purpose of this article to restore the discussion of the subject to proportions which correspond more nearly to the facts and conditions of the present. The extravagant claims made

for the incentive wage systems by their advocates are, to any one who reads them critically, largely self-contradictory and mutually destructive. In any summation of the advantages and disadvantages of the various systems it will be found that the points claimed for each are largely identical with those claimed for the others. This condition largely arises from the fact that each group, in stating the advantages of its favorite method, presupposes an ideal management to be administering it, and a hopelessly incompetent one to be administering its rivals; the results are, of course, very satisfactory to themselves."

After describing and discussing various incentive methods of wage payments, Professor Sanders concludes,

"A study of many cases points to the conclusion that, speaking generally, the burden of proof still rests upon the incentive wage methods to show their superior efficacy as compared with the simpler time- and piece-wages. They have so often been associated with complete and careful revisions of manufacturing control and processes that there is plausibility in the impression that they are the significant factor in the resulting successes. Such a conclusion, however, overlooks the essential nature of business management; it errs in mistaking one of the devices of management for management itself, and is likely to divert attention from the real elements of successful administration. There is no intention here to be unduly critical of the various systems in themselves; it is admitted that most of them have served well in given cases, but these successes have been not so much based upon their innate virtues as derived from their use in the hands of intelligent executives who, with equal intelligence and equal care, would have been just as successful with other tools.

"The Bedeaux system appears to be an exception to this rule, but its more recent successes have been due to its embodying the principal advantages of a piece-rate, and further advantages for certain administrative purposes. But the great majority of men are still paid on time- or piece-wages."

Measures of occupational success are necessary in industry in evaluating training methods, recommending employees for promotion, and in evaluating methods of selecting employees. Dr. W. V. Bingham discusses various criteria of occupational success from the viewpoint of their usefulness in the study of scientific selection methods. These criteria are:

1. Time required to train the employee.
2. Standing in corporation schools.
3. Quantity and quality of output.
4. Performance in standardized examinations.
5. Accidents and loss due to breakage or claims.
6. Salary.
7. Commissions and bonuses.
8. Length of service or stability on the job.
9. Advancement in the firm.
10. Degree of responsibility.
11. Membership in professional societies.
12. Trade status.
13. Ratings.

Other articles worthy of note in this issue are: "The Management Aspect of the Comptroller's Work," by "X"; and "Sales and Orders as an Aid in Forecasting," by Edmond E. Lincoln.

# Labor Market Comparisons

## Turnover Rates in Four Metal Manufacturing Centers

By Anne Bezanson, *Department of Industrial Research, University of Pennsylvania*

*One of the significant features of present day industrial research is the willingness of firms to pool their information. Forward looking executives realize that comparisons of present with past conditions in their firms are not adequate for an industrial orientation; that it is necessary to compare present conditions in the firm with general conditions in the trade, possible only through coöperative fact-finding.*

*While this report covers only what the author calls the early stages of an experiment in coöperative research, it makes available important information for the industries concerned. Continuously supplied information of a like sort will enable the personnel executive to observe whether changing employment conditions in his plant are a reflection of management policies or of changes in the labor market.*

Labor turnover since 1920 was studied in four metal manufacturing centers. These centers, with the number of employees studied in each, are Detroit, 116,000, Milwaukee, 19,000, New York, 9,000, and Philadelphia, 40,000.

Turnover fluctuations were similar for the four centers.

Turnover levels varied considerably among the centers. This difference in levels is due largely to type of product manufactured and rate of growth of pay rolls. Light machine shops, where a high percentage of skilled workmen are employed, have the lowest turnover. Heavy pressed metal and heavy structural plants, employing a large percentage of unskilled labor, have higher turnover. When plants of similar sorts are compared, the curves of turnover tend to coincide. Turnover rate increases with growth of pay roll.

IN THE early discussion of labor turnover, emphasis was placed upon the significance of the problem to the individual establishment. Turnover rates were considered either on account of the cost of a high rate or of the personnel methods that would be necessary to reduce the turnover level. The emphasis of the discussion left the work of assembling data to the individual plants, with the result that there are few collected data available for any considerable number of plants over a long period.

More recent investigation has tended to shift the emphasis to discussion of labor turnover in terms of the type of industry, the geographic location, and the state of market activity. To reveal adequately the place of these factors, data are needed for a large group of plants.

The study of 55 metal manufacturing plants was begun in Philadelphia to try to explain the differences in turnover rates from time to time at the same plant, and to account for such extreme differences as the monthly figures indicated from company to company. In interpreting the Philadelphia data, the study was extended to include the experience of other metal areas.

### EXTENT OF THE DATA

In this paper, the discussion is confined to the experience of four metal manufacturing centers—Detroit, Milwaukee, New York and Philadelphia.[1] In order to show a time series over a considerable period, it has been necessary to use general data which have not been kept in sufficient detail to give major subdivisions. The average number on the roll and the number of separations are available for 38 Milwaukee plants from 1920 to date. In the three other areas, entrances as well as separations have been kept and the rate of accessions can be compared with the rate of separations. The Philadelphia and Detroit material begins in April, 1923; the data for both New York and Milwaukee in 1920. In only two areas is it possible to separate resignations (voluntary separations) from discharges and lay-offs. The main dependence, then, is upon time comparisons of three items: total separation rates, entrance rates, and number on the roll. The comparisons were undertaken to find out whether there was any agreement in the time and amount of fluctuations in turnover in the various districts. Comparable existing data have been used. The interpretation is based upon these general data with the hope that if any indications of value are disclosed further detailed data may be collected to construct barometers of labor turnover for the metal industry in typical areas.

The areas are not equally represented in the data, either in numbers or in proportion of metal employees. Besides, they differ greatly in the number of large and small plants. For September 1926 the records include 36 plants in Detroit with about 116,000 employees, 38 plants in Milwaukee with 19,000 employees, 40 plants in New York and Northern New Jersey with 9,000 employees, and 55 plants in Philadelphia with about 40,000 employees.

[1] The major credit for starting a study of the value of personnel activities in the plants reporting turnover to the Metal Manufacturers' Association of Philadelphia is due to Mr. Earl S. Sparks. The turnover data are part of the quantitative material of that more comprehensive study. In order to extend the work and check the findings the Metal Associations in the other areas made their data available. The Department of Industrial Research of the University of Pennsylvania is glad to have this opportunity of expressing appreciation, especially to Mr. W. J. Fairbairn of Milwaukee, Mr. Wm. J. Cronin of New York, and Mr. Chester Culver and Mr. George Grant of Detroit.

In each area the firms included in this study represent a wide variety of metal manufactured products. A high concentration of any one type of manufacture might be expected to affect turnover levels. Again, to include an area with the new development and rapid expansion of Detroit, the relation of total turnover rates in the various markets.

COMPARISONS OF TURNOVER RATES

Monthly turnover rates have been computed on an annual basis. Figure 1 shows composite curves for each of the four markets.

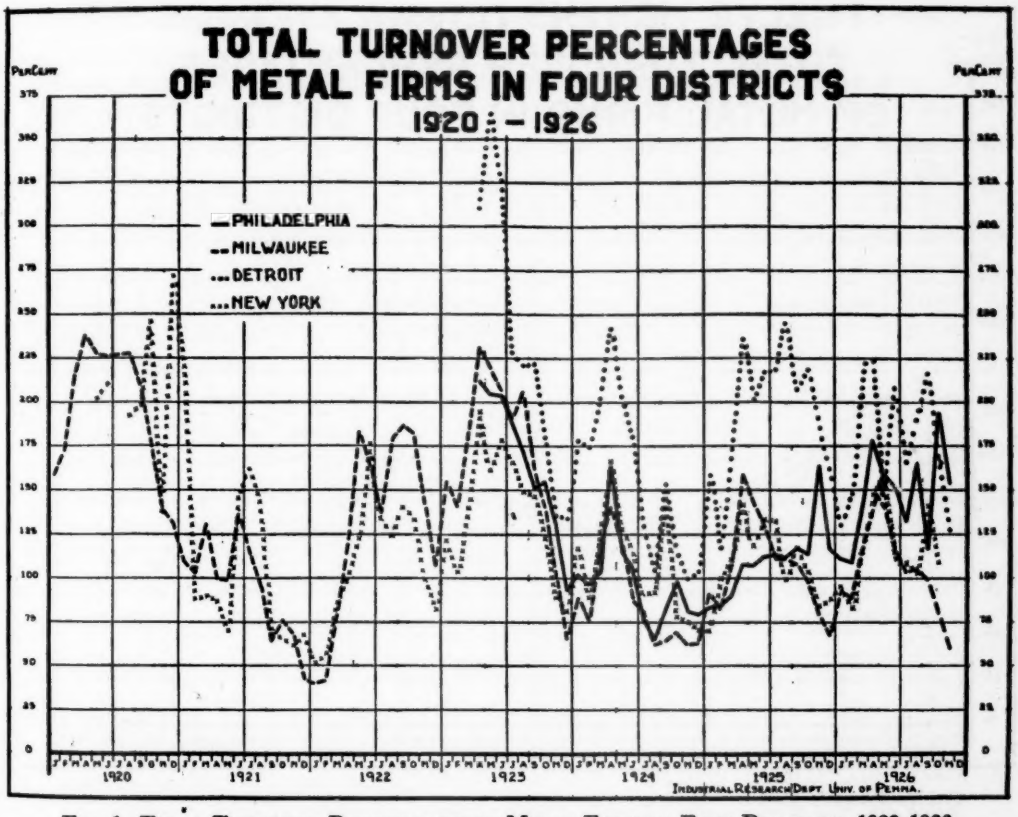


FIG. 1. TOTAL TURNOVER PERCENTAGES OF METAL FIRMS IN FOUR DISTRICTS, 1920–1926

is to compare a new center with old and long established metal centers having nuclei of long-service employees. These factors are important. Further, the areas differ in the relative importance of light and heavy products. Before passing to a description of these factors, attention is called to

Two aspects of the chart attract attention at once. The first is the similarity in time and direction of the upward and downward swings. The irregular downward movement of the last half of 1920 and 1921 is interrupted by extreme peaks, due to the inclusion of lay-offs in the total

curves. The Milwaukee and New York curves move upward in 1922 with a seasonal drop in November and December and continue upward for the first four months of 1923. All areas reach their high point in April, except Detroit which had its peak turnover rates, moderate in Philadelphia but more marked in other centers. At the present time, and throughout the past twelve months, the upward and downward swings have not corresponded closely. For instance, when Philadelphia rates increased at

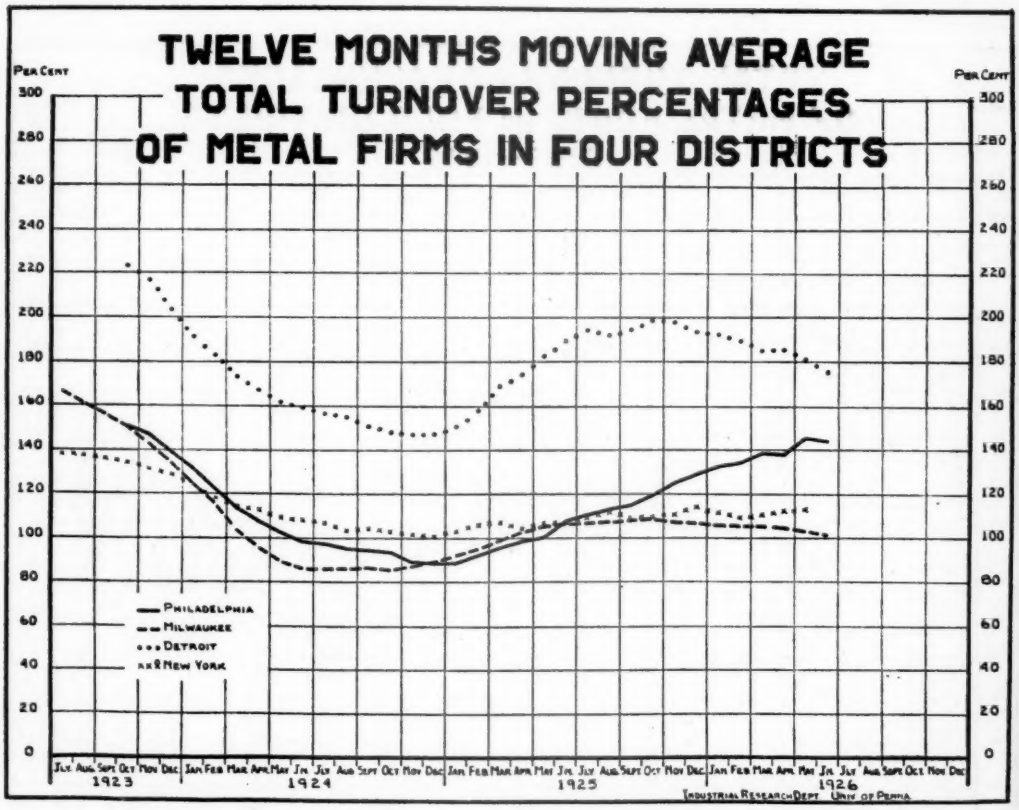


FIG. 2. TWELVE MONTHS MOVING AVERAGE OF TOTAL TURNOVER PERCENTAGES OF METAL FIRMS IN FOUR DISTRICTS

one month later. The drop during the recession of business in the last half of 1923 is very marked in all areas. The business inactivity of 1924 kept the turnover rates low in all areas by contrast with 1923. By January, 1925, improved employment conditions were reflected in increasing the end of 1925, Milwaukee and New York moved steadily downward. This inverse movement has been repeated in recent months.

The second outstanding aspect of the curves is the difference in turnover levels. Detroit, the dotted curve on the chart, continued above the other

markets in every month throughout the whole period, for which data are available. On the whole, Milwaukee, the curve represented by dashes, tended to maintain the lowest level.

To make clear the difference in turnover levels, figure 2 shows a twelve months' moving average of turnover rates.[2] With the exception of six months in 1925, Milwaukee had the lowest level of turnover. Philadelphia ranked second until the middle of 1925, when it swung above the curves of both Milwaukee and New York, and has continued to increase more rapidly than has the higher Detroit curve. The New York curve represents a smaller number of employees than the other curves and might be expected to show more rapid fluctuation.

Casual examination of figures 1 and 2 discloses: A similarity in the fluctuations in turnover curves, a contradictory inverse movement in this fluctuation, especially in the Philadelphia market, in the past year, and a wide divergence in the turnover levels in different markets.

### INFLUENCE OF GENERAL INDUSTRIAL ACTIVITY

The similarity in the contour of the curves points to the influence of the up and down swings of general industrial activity. It is impossible at this time to say how closely the fluctuations in turnover correspond to fluctuations in market activity, nor are the data in the form to give an answer to such an inquiry. The total turnover curves are difficult to interpret without supplementary information. The inclusion of lay-offs in the totals raises the curve at a time when voluntary separations are falling off rapidly. Temporary lay-offs continue throughout all periods, but extreme peaks are concentrated in periods of declining production. Discharge rates increase rapidly when new employees are being added to the rolls and are more related to the rate of new hirings than to the rate of separations for all other causes. For any refined comparisons with market conditions, resignations, the major item in labor turnover, must be separated from discharges and lay-offs. The fact that the total curves disclose so much likeness of movement shows the value of elaborating the data to differentiate the other items.

The turnover curves of the past year show dissimilarity of movement. Rates in New York and Milwaukee are declining, Detroit is maintaining a fairly uniform level, and Philadelphia is rising rapidly. Some of this divergence in the Philadelphia curve may grow out of the effect of the Sesqui-Centennial and the attendant building programme. Another factor is the marked increase in pay rolls in the past year in this market.

The variation in turnover levels can be accounted for, in part, by differences in the type of product manufactured in the four markets, and differences in the rate of growth of pay rolls.

### INFLUENCE OF TYPE OF PRODUCT MANUFACTURED

To study the effect of differences in type of product, a more detailed

[2] The average for the calendar year is located in the month of July.

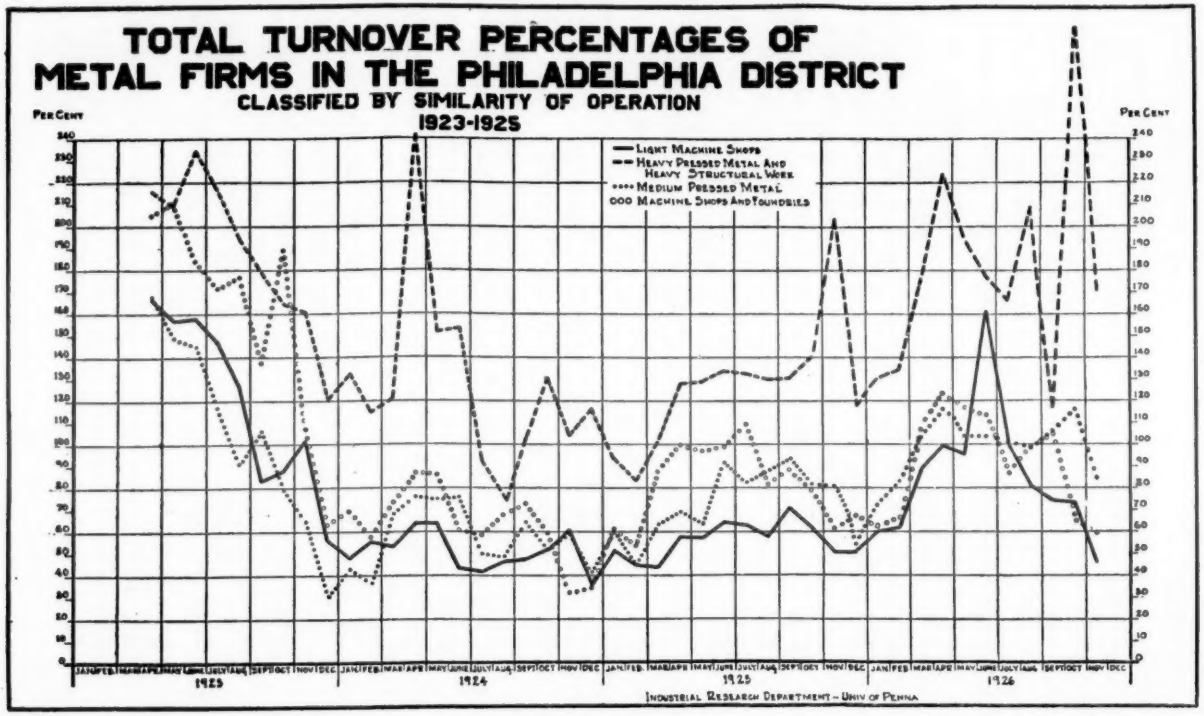


FIG. 3. TOTAL TURNOVER PERCENTAGES OF METAL FIRMS IN THE PHILADELPHIA DISTRICT, CLASSIFIED BY SIMILARITY OF OPERATION

grouping of plants is necessary. For this purpose, the 55 metal plants in Philadelphia were classified by a committee of representative manufacturers.[3] The grouping, based on similarity of operation, was aimed to place together plants with like grades of skill in their work.

Figure 3 shows total turnover rates for four types of metal manufacture in the Philadelphia district. The basis of classification is as follows:

*Machine Shop and Foundry.* Plants having both machine shop and foundry, and manufacturing products such as hydraulic machinery, textile machinery, machine tools, injectors, forgings, condensers and miscellaneous heavy machinery.

*Light Machine Shop.* Plants manufacturing textile machinery, (no foundry), electrical devices, plumbing supplies, monotypes, paper box machinery and heating apparatus. All having machine shops of light character.

*Heavy Pressed Metal and Heavy Structural Work.* Plants manufacturing automobile bodies, pressed steel pulleys, steel wheels, trolley cars, car trucks, boilers and tanks.

*Medium Pressed Metal.* Plants manufacturing conveying machinery, buckets, steel sashes and windows, drying machinery, metal sleds, agricultural implements and steel safes.[4]

[3] The members of the committee coöperating with the Industrial Research Department of the University of Pennsylvania are: Mr. H. A. S. Howarth, chairman, Dr. S. Basney, Mr. J. S. Disston, Jr., Mr. W. S. Eaton, Mr. G. B. Whitehead, and Mr. E. S. Sparks, secretary Metal Manufacturers' Association.

[4] The fifth group, not included in this chart, is:

*Light Pressed Metal and Electrical Instruments.* Plants manufacturing hooks and eyes, steel pens, locks, watch cases, electrical fixture sockets, balls and ball bearings, electrical heat measuring instruments, radios, ignition and dental instruments.

The curves make clear two important influences affecting labor turnover. First is the evidence of general market forces in the likeness of upward and downward swings. All curves move downward in the last six months of 1923, reaching their lowest point in December or January. By March all curves have an upward direction, the heavy pressed metals having a very extreme peak in April and high rates in May and June. The movement for 1925 is especially striking. Curves swing upward at about the same time, preserving in this swing their relationship to each other. It is noteworthy that the correspondence is not only in major swings, but in many of the minor fluctuations. In June 1926, the relationship was disturbed by a high peak in the light machine shops, but the curves have swung back to their former position.

A second characteristic of the curves is probably of greater significance than the similarity in direction. The lowest curve on the chart is that of light machine shops. These plants employ a high percentage of skilled workmen and have a minimum of large machines or heavy operations. Next in extent of turnover is the medium pressed metal group. This curve follows the light machine shops closely. It is slightly higher than light machine shops throughout most of 1924 and 1925, but dropped more rapidly in the decrease in turnover rates of the last half of 1923. The heavy machine shops and foundries shown in the curve outlined by circles on figure 3 had a higher general level of turnover than the light machine shops or medium pressed

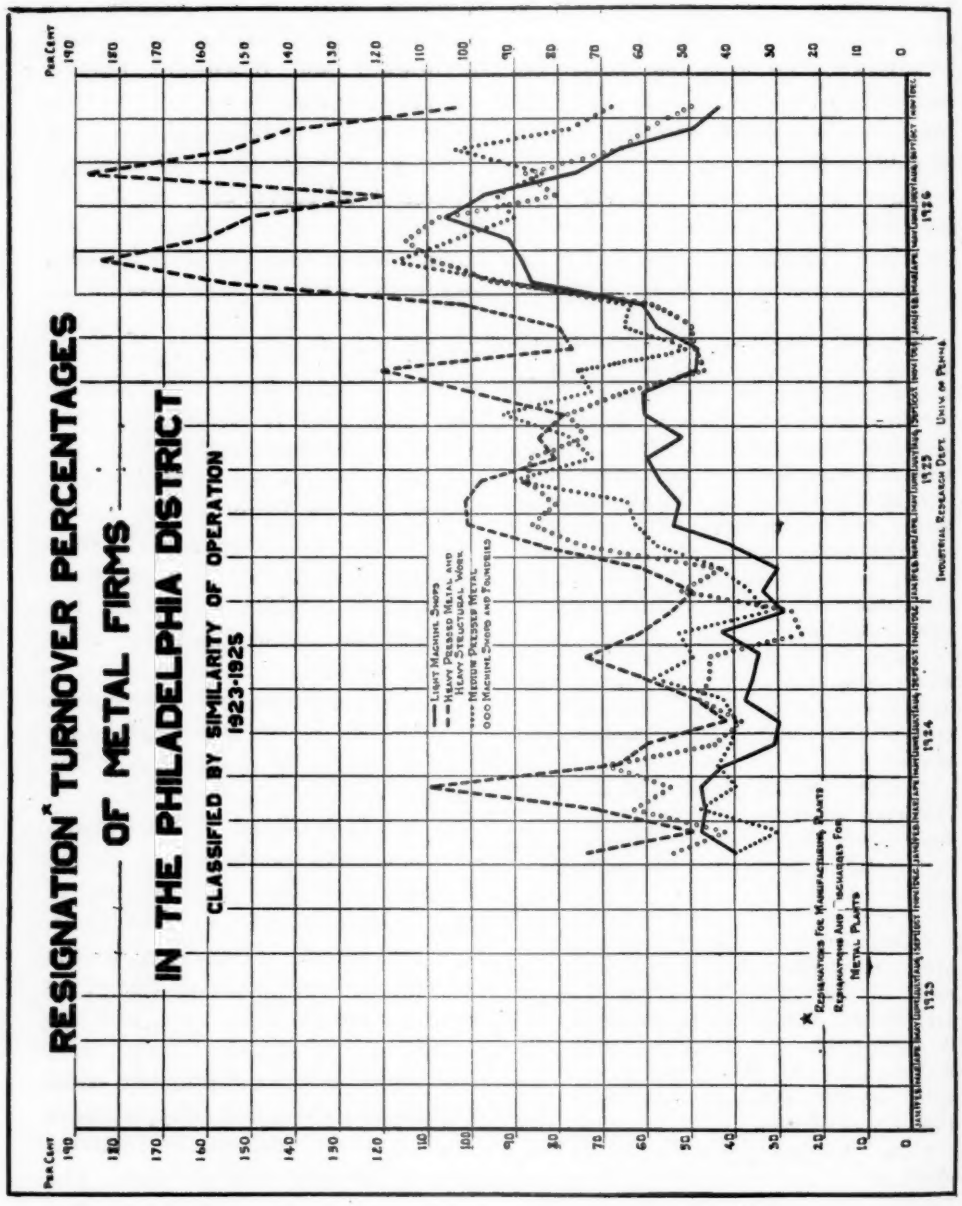


FIG. 4. RESIGNATION TURNOVER PERCENTAGES OF METAL FIRMS IN THE PHILADELPHIA DISTRICT, CLASSIFIED BY SIMILARITY OF OPERATION

metals throughout the whole period of the record. Whether this is due to the inclusion of the foundry occupations or to the heavier character of machine shop operations it is impossible to determine. Far above the other curves is shown the combined total turnover rates of heavy pressed metal and heavy structural plants. It is probable that the characteristically high level of turnover in these plants is due to a large percentage of unskilled labor as well as the heavier character of the occupations. Whatever the cause, it is evident that the data are increased in value for any plant desiring to compare its turnover level with that of other plants by classification according to *type of product.*

Since the conclusions drawn from this figure are important in any sampling of plants of different markets, it is supplemented by a companion figure giving resignations and discharges by type of product. Figure 4 shows the same persistence in the relationship of the various curves to each other, already noted in the total turnover curves, with the exception of the midsummer months in 1925 when the movements are confused and puzzling.

What conclusions may be drawn from these charts in making intra-market comparisons of labor turnover? If the heavy pressed metal and structural steel plants regularly have higher turnover rates than machine shops and plants making light standard machine equipment, then the level of turnover in an area will tend to be high if a large proportion of heavy pressed metal plants are included.

This is precisely the situation in the Detroit market. The automobile body plants constitute a high proportion of the Detroit group. With this weighting of heavy metals it would seem likely to expect a somewhat higher rate of turnover in the Detroit market. By contrast the Milwaukee market is primarily a machine shop area with no heavy pressed metal plants in the group reporting turnover. New York parallels the Philadelphia grouping fairly closely. Not only is the subdivision of plants desirable within a market, but for comparison between markets it is essential if the extent of turnover instead of fluctuations in turnover is to be considered.

It is believed that the committee which made the grouping of plants has furnished a classification of practical value in comparing markets, as well as of scientific value in sampling data for the construction of indexes of turnover and employment in the metal industry.

For practical purposes, a more adequate comparison of the different markets is obtained when a group of plants of the same type is considered instead of all plants. It is not possible in the space of this paper to publish separate charts for each type of product. Only one such chart is presented.

Figure 5 shows the important group of machine shops and foundries in three areas. There is no similar group in the Detroit market. It is evident that when identical groups are compared the three markets tend to follow each other very closely. The peaks are not coincident but the gen-

eral tendency is similar and the difference in turnover rates is not great.

Sweeping conclusions should not be drawn from this discussion of turnover by type of product. The findings of the Philadelphia market turnover tends to rise in periods of market activity. In other words the form of the curve depends upon the up and down swings in general business conditions. How much of the variation in turnover levels is due to differences in type of product, how

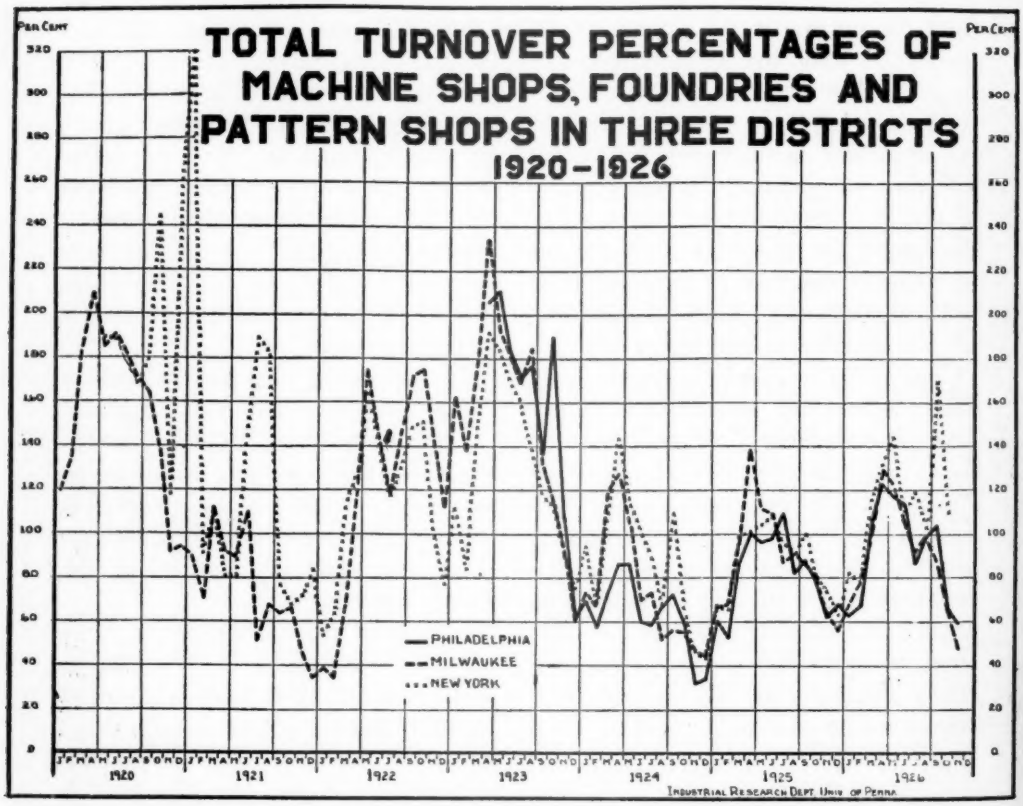


FIG. 5. TOTAL TURNOVER PERCENTAGES OF MACHINE SHOPS, FOUNDRIES, AND PATTERN SHOPS, IN THREE DISTRICTS, 1920-1926

have been checked in the other areas. In all markets the light machine shops had the lowest turnover, and the heavy pressed metals the highest. The other groups did not show such well marked permanent levels in all areas as in Philadelphia.

It is evident that in every area much to managerial policy, or how much to differences in the rate of pay roll increases it is impossible at this time to determine. The figures indicate that plants should give the same attention to ascertaining the month to month movements of turnover within major occupations that

has been given to total figures for plants.[5]

Having established the fact of differences in turnover levels, it is necessary to make some analysis of employment conditions and accession rates.

### INFLUENCE OF NUMBER ON PAY ROLL

The number on the roll indicates roughly the major swings in business activity in these groups of plants in much of the post-war period. This, of course, is true only roughly. The number on the roll does not decrease as quickly in a downward swing as do orders, since the first slackening is likely to be met by reduced working time. Again, in an upswing, a return to full-time operation or the working of overtime takes care of the first increase in orders. Again, over a considerable period, changes in organization and equipment may reduce the number of men needed to produce a given amount of work. With these qualifications the number enrolled may be considered as indicative of increase or decrease in production.

The index of number on the roll for Milwaukee is especially interesting as it is the only one of the four metal areas in which the present number employed approaches closely the high level reached in the post-war activity of 1920. A decrease in numbers began in December 1920, and continued throughout 1921 and the first months of 1922. From March 1922 until May 1923, rolls were increased. In this period the Milwaukee decreases started later but were more violent, and recovery was slower than in New York or Philadelphia. The recession of the last half of 1923, and the depression of 1924 were similar to those experienced in other areas. The year 1925 began with indications of a considerable market activity, heralded, in fact, by an increase in number on the payroll in December 1924. What is unusual about the upswing is that the market rose nearly 10 per cent above the point reached in the peak of 1923, and was less than 3 per cent below the maximum of 1920. The recent months have shown a slight decrease in numbers employed.

By contrast with Milwaukee, Philadelphia in recent months has approached the high point of 1923 but is far below the number employed in the post-war activity. This contrast with 1920 is explained by the fact that Milwaukee plants included in this group are mainly manufacturing standard machine equipment and did not have the long-continued and severe readjustments of some of the heavy structural steel plants and shipyards of the Philadelphia district. If the shipyards were omitted the gains in Philadelphia would be more evident. On the other hand, in the 1925 expansion the Milwaukee group had greatly outdistanced the two eastern markets. The upswing in Philadelphia, which was interrupted in November 1925 by lay-offs in the light metal and electrical instrument plants, has regained momentum and

[5] I am glad to announce that the Philadelphia Metal Manufacturers' Association has decided to extend the turnover inquiry in this direction.

the present movement is definitely and rapidly upward.[6]

The Milwaukee market has been given special attention in this discussion of number on the roll, because entrance ratios are not available. Besides, the relatively low turnover figures in 1926 shown in figure 5 for machine shops and foundries were maintained at a time when pay rolls for the group were about 8 per cent above the average of 1925.

### INFLUENCE OF ENTRANCES AND SEPARATIONS

The number on the roll shows the positions that were kept filled but does not show the amount of stability in these positions. Where data for separations and entrances are available a comparison of the accession and turnover rates shows both fluctuation and pay roll increases. For three areas, Detroit, New York and Philadelphia, these comparisons are made in figure 6.

The areas between the curves have been shaded to show the times when increases were taking place. Comparing the period after April 1923, it is evident that during the last half of 1923 accessions and turnover fell off in about the same way. In the first half of 1924 there was a continuous net decrease in New York and Philadelphia through failure to replace separations. The Philadelphia market began a gradual monthly net addition to rolls in June 1924 and continued the increase with only two recessions of importance. The one in November and December 1925 was confined to a few large plants. The increases in New York began later in 1924 (October). The gains in New York were not so continuous and the year 1926 records no such activity as is indicated by the enormous increases in the Philadelphia plants since June 1926. Detroit's increases in 1924 and 1925 were measurably greater than those experienced in other areas. Entrance rates kept far above turnover rates. The net effect of the period from July 1925 to February 1926, was a continuous increase in numbers employed. This high rate of entrances in Detroit accounts, in part, for the level of turnover shown in figures 1 and 2.[7]

This discussion of entrances is given mainly to show the periods when opportunity for employment was greatest in the various markets. Labor turnover has so frequently been discussed in terms of the individual plant and management policies affecting turnover rates that emphasis is purposely placed upon the general experience of a large group of plants.

[6] In thus interpreting the figures of a group of plants with continuous records much of the market changes are overlooked. Some plants go out of business, new plants start. An adequate consideration of employment conditions would evaluate these changes. The new developments in Philadelphia have been of importance. In this discussion the statements apply to plants with continuous records, and the other factors are omitted.

[7] It will be recalled that in this market the figures represent a large number of employees and that an increase in pay rolls of 10 or more per cent in a month represents eleven to twelve thousand new employes over and above those hired to replace separations.

In a period when most plants in an industry are busy, it is quite possible for a particular group of plants in the market to find the opportunities at other plants affecting their turnover rates even though no increases take place within their own group. Figure 7 illustrates this point.

Figure 7 gives an index of number on the roll in Philadelphia by type of product. It will be evident that until recent months the great gains

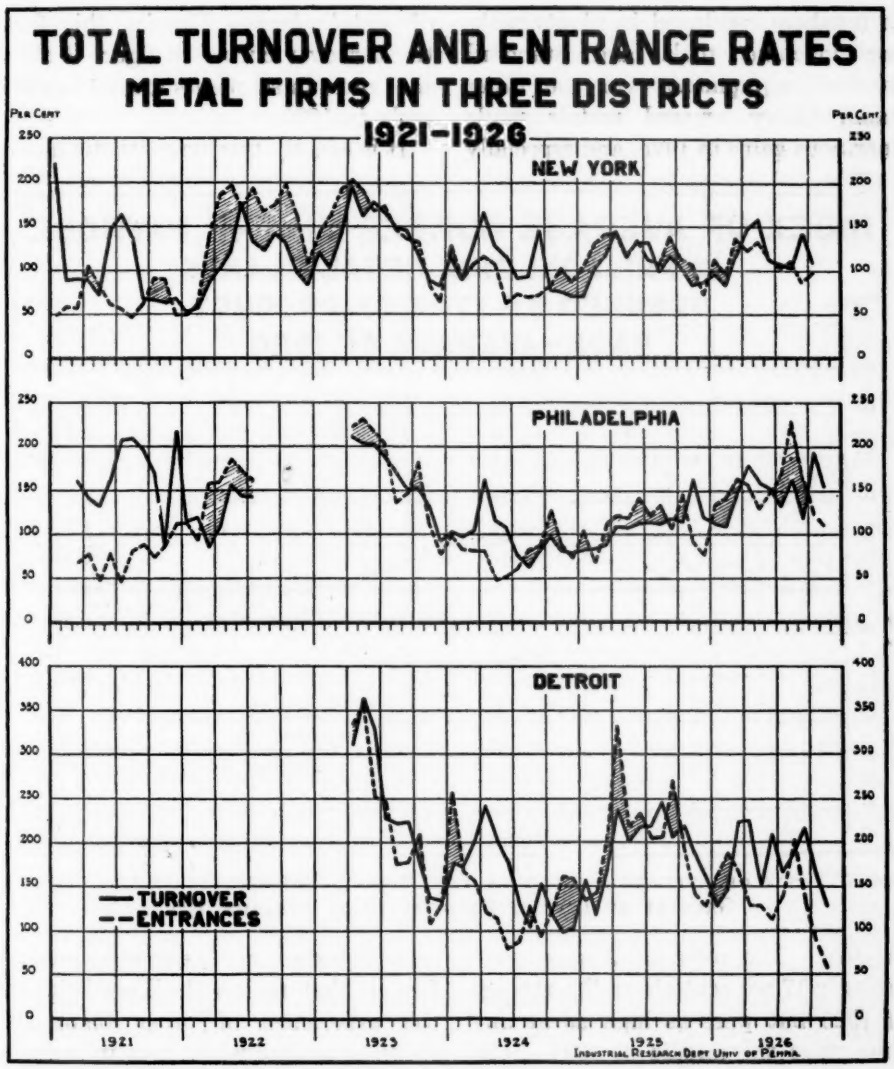


FIG. 6. TOTAL TURNOVER AND ENTRANCE RATES OF METAL FIRMS IN THREE DISTRICTS, 1921–1926

in number on the roll took place in the heavy pressed metal and electrical instrument groups. In fact, until the very end of 1925 there were no gains in numbers employed in plants making machine tools and standard machine equipment. On the other hand, heavy pressed metals made enormous gains in 1925, and especially level of earlier years. In other words the increased opportunity for employment in 1925 and the first half of 1926 were largely in two groups of metal plants. Despite this fact, the turnover curves in figure 3 show that rates in all plants moved upward early in 1925.

It is exactly this sympathetic move-

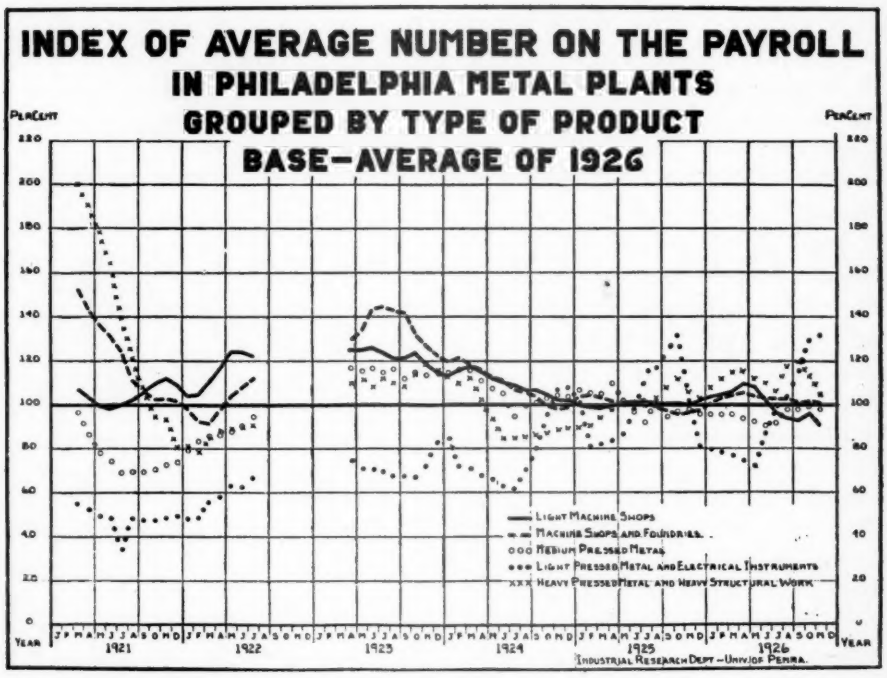


FIG. 7. INDEX OF AVERAGE NUMBER ON PAY ROLL IN PHILADELPHIA METAL PLANTS, GROUPED BY TYPE OF PRODUCT. BASE AVERAGE 1925

in 1926. The rolls for August were not only 17 per cent above the average of 1925 but were as high as at any time since the middle of 1921. The electrical instrument group shows the violent fluctuations incident to the making of specialty products and radio equipment. Despite this fluctuation, the level attained at present is far above the peak of 1923 or the ment in turnover occasioned by market factors that makes the knowledge of the experience of other plants of value to an individual firm in judging its own experiences.

## SUMMARY

Only the most evident conclusions have been stressed in commenting upon the charts given in this paper.

The data are presented in the early stages of an experiment in coöperative research. The time covered is only of moderate length, broken by four periods distinctly different in industrial character. The usefulness of the data would be greatly increased by more detailed reporting, which would make possible an analysis of the components lumped together in these total turnover curves. Even in this form some claim can be made for the value of the group comparisons.

Two uses of the data have been kept in mind. The first is the value to an industrial establishment in comparing its experience with that of a group of plants in the same market and dependent upon the same labor supply. Any careful study of the figures of individual plants will show that even the best-managed do not succeed in maintaining an even level of turnover from month to month. The turnover rates of an individual establishment tend to rise in times when production is increasing, or recruiting is active in other plants. The group curves show the effect of this tendency in the 1923 and 1925 upward swings. A personnel program introduced in this period would probably fail to maintain as low a rate of separations as the plant had had in an earlier period and yet might be regarded as successful if it helped to prevent as violent a rise as other plants averaged. In an inactive period turnover rates tend to decline. The individual plant, considering its own experience, tends to credit the decrease to some change of policy within the plant when the same type of decrease is being felt by all other plants. The knowledge that turnover has decreased is not enough. The decrease may be less than others experienced.

A broader use of the data was in mind in extending the turnover inquiry into other markets in the same industry. One of the indications of a change in the demand for labor is an increase in resignation rates. The increase in one area may be due to unusual factors and may not be of long time significance. Even if the increase is general the knowledge of its amount and significance is disseminated slowly from area to area. Later still the knowledge reaches the individual establishment. If the normal divergence of an area from the general experience of the industry were known, more ready adjustment to meet market changes would be possible. In other words, labor turnover should be considered as part of the whole process of adjusting the supply of labor to the demand for it. Can the market figures of turnover be used to show the changing opportunities for employment?

Enough areas have not been included in this study to warrant the construction of an index for the metal industry. If there were no similarity in the time and character of fluctuations the idea of constructing such an index would be abandoned. The findings are given at this early stage with the hope that the work may be further extended.

*(Manuscript received November 17, 1926)*

# Permanence of Men and Women Office Workers

By Marion A. Bills, *Aetna Life Insurance Company*

*This report brings to mind at once Mr. Bergen's report on the same topic which appeared in the Journal for July, 1926. Their results are in striking agreement, and definitely dispose of the arguments against women workers on grounds of instability.*

This is a report on the comparative stability of 635 men and women office workers hired by the Aetna Life Insurance Company from 1920 to 1923 inclusive. Relative stability is measured by comparing proportions remaining with the firm and average length of service of those who left the firm. Almost equal percentages of men and women hired were still with the firm up to the time of this report (25 per cent of men and 26 per cent of women). Of those who left the firm the women exceeded the men by about a fourth of a year in average length of service.

THIS study of the relative permanence of service of men and women office workers hired by the Life Department of the Aetna Life Insurance Company, Hartford, Connecticut, covers the years 1920, 1921, 1922, and 1923. It does not go back further than 1920, because very few women were employed by this Company before 1917, and because the period from 1917 to 1919 was a most abnormal one for employment. For example, in 1919 out of 65 men employed, 47 had previously worked for the Company and were re-employed upon returning from the army. We have not included those employed since 1923 because we did not feel that sufficient time had elapsed to judge their permanence of service.

In these four years there are two in which employment was very heavy, years in which the Company was expanding rapidly, and two years in which employment was light, the Company's business showing a smaller increase. This would seem to give us a fair sample of employment conditions. It gives us 635 cases from which to draw conclusions.

There are two approaches in any study of permanence of service. One determines how many of those employed in any given year have remained with the Company up to the present time; and the other studies the length of service of those who left the Company.

### NUMBER REMAINING WITH THE COMPANY

Table 1 shows by years of employment the percentages of men and women still with the Company. Of those employed in 1920, a larger percentage of the men than of the women

have remained. Of those employed in 1921, 1922, and 1923 the percentage of women still with the company is greater than that of men. All cases considered, the percentage of women exceeds the percentage of men remaining by one point.

TABLE 1

*Per cent of men and women still with the Company*

| YEAR EMPLOYED | | NUMBER EMPLOYED | NUMBER STILL WITH COMPANY | PER CENT STILL WITH COMPANY |
|---|---|---|---|---|
| 1920 | Men | 82 | 17 | 21 |
| | Women | 201 | 30 | 15 |
| 1921 | Men | 15 | 2 | 13 |
| | Women | 26 | 6 | 23 |
| 1922 | Men | 32 | 9 | 28 |
| | Women | 38 | 11 | 29 |
| 1923 | Men | 87 | 26 | 31 |
| | Women | 154 | 63 | 41 |
| Total | Men | 216 | 54 | 25 |
| | Women | 419 | 110 | 26 |

All of the above figures would seem to indicate that the same percentage of men and women hired during 1920 and subsequently have remained with the Company up to the present time. That is, the argument so often used against the hiring of women, that they are not permanent, is probably fallacious.

These figures cover only the first 3 to 6 years of employment, and do not indicate whether this percentage will remain the same up to 15 or 20 years. Our own belief in this matter is that the percentages for men and women remaining will continue equal up to 8 or 10 years of service, but that the percentage of men remaining for 15 to 25 years will be greater than that of women. No data, however, are available to support this theory and the author frankly admits that it is merely an impression gained from considerable experience with the clerical group. We do not believe that this would be an argument for or against the hiring of women, since eight to ten years of service pays for probably the most intensive training given for any clerical job and occasionally a person leaving after fifteen or more years offers a promotional possibility which is desirable.

### LENGTH OF SERVICE OF THOSE LEAVING

Table 2 shows in detail the average length of service of those leaving the Company. For every year the average length of service is greater for women than for men. This is probably due to the fact that women make up their minds less readily to leave, and that as a whole, division heads are more lenient with women than with men, and take longer before deciding their efficiency is such that they cannot stay. In every instance the percentage of men leaving within one year is greater than that of women.

The fact clearly brought out by the figures covering six years, namely, that women who eventually leave the Company tend to stay longer before leaving than men, is probably no argument for or against the hiring of women. If a person is to leave within about a year's time it is perhaps better that he leave quickly before a great deal of time has

TABLE 2

*Length of service of those leaving Company*

| YEAR EMPLOYED | | PER CENT LEAVING IN YEAR INDICATED | | | | | | | PER CENT STILL WITH COMPANY | AVERAGE YEARS OF SERVICE OF THOSE LEAVING | AVERAGE YEARS OF SERVICE OF ALL EMPLOYED* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0–1 | 1–2 | 2–3 | 3–4 | 4–5 | 5–6 | 6–7 | | | |
| 1920 | Men | 48 | 12 | 5 | 5 | 5 | 4 | 0 | 21 | 0.92 | 2.19 |
| | Women | 43 | 25 | 4 | 3 | 6 | 2 | 2 | 15 | 1.01 | 1.92 |
| 1921 | Men | 27 | 20 | 27 | 0 | 13 | 0 | | 13 | 1.46 | 2.06 |
| | Women | 19 | 19 | 4 | 26 | 8 | 0 | | 23 | 1.80 | 2.77 |
| 1922 | Men | 37 | 25 | 6 | 3 | 0 | | | 28 | 0.65 | 1.87 |
| | Women | 34 | 19 | 5 | 8 | 5 | | | 29 | 1.04 | 2.18 |
| 1923 | Men | 34 | 25 | 3 | 7 | | | | 31 | 0.75 | 1.72 |
| | Women | 25 | 19 | 10 | 5 | | | | 41 | 0.90 | 2.16 |

* For this figure we have assumed that all persons still with the Company will remain through their 1927 anniversary.

been put into his training. However, if he tends to stay over a year, probably there is a gain with every month that he stays. This naturally does not apply to jobs where only a few weeks' training is necessary to reach efficiency on the job, but rather to jobs which are more difficult in themselves or which should lead to promotion.

(*Manuscript received December 16, 1926.*)

# Selective Placement of Metal Workers

## II. Development of Scales for Placement

By Millicent Pond, *Scovill Manufacturing Company*

*Dr. Pond continues her account of one of the most important and extensive studies ever attempted in the selection of factory workers. She describes in the present article the development of the series of employment measures which are now in use provisionally for the selection and placement of metal workers at the Scovill Manufacturing Company.*

Continuing the account begun in the Journal of Personnel Research for January, 1927, the author describes the second year's investigations of measuring instruments for the selection of metal workers. The research program was elaborated, with changes in procedure, increase in number of subjects, and changes in treatment of records. Data from 3184 employees were analyzed. The criterion of success was the employee's ability and willingness to stay on the job for at least six months. Critical scores and preferred ranges were set off in a number of intelligence tests and personal history items for each of sixty-five occupational groups. Scales based on total scores are in use provisionally at the Scovill Manufacturing Company for selecting employees for these occupations.

Preferred ranges in tests and personal history items vary so widely for the different occupations, that almost every applicant qualifies for one or more of these occupations. Thus no injustice is done to the applicant and no manpower is lost to the firm.

DURING a second year of investigation of the value of intelligence tests for the selective placement of metal workers, the general problem took on a narrower aspect. It became the problem of finding what relation might exist between test scores or other employment measures, such as age, schooling, etc., and labor stability, or stability and quality of workmanship taken together. Certain changes were made in procedure and in treatment of results, and because of the increased number of subjects, further refinements in the occupational classification were possible.

In noting these changes it is necessary to refer frequently to descriptions given in the preceding article in this series. We have given the present material the same arrangement, and shall depend upon similar section titles to make the references easy for the reader.

### Test Scores and Other Measures

The tests were not changed and were given during the second year of the experiment exactly as during the first

year. Since it is convenient to refer to them by number, a list is given herewith:

Test 1. Picture Completion. Non-verbal.
Test 2. Number Checking. Non-verbal.
Test 3. Digit-Symbol Substitution. Non-verbal.
Test 4. Geometrical Construction. Non-verbal.
Test 5. Arithmetical Reasoning. Verbal.
Test 6. Synonym-antonym. Verbal.
Test 7. Analogies. Verbal.
Test 8. Circle Crossing. Non-verbal.

Although there was no change in the testing procedure a new use was made of some of the test data. For several of the occupational groups the number of errors made in the various tests was tried out, as well as the number of correct responses. A limited trial showed that only the number of errors made in Test 2 bore any relation to the criteria of success. In several instances, however, notably for toolmakers and for routine clerical workers, this measures combined with others did prove significant.

Age and schooling, as in the preliminary studies, were taken from the statements of the employees, without verification in records outside of the company. Both were expressed in terms of the number of years completed at the time of hiring.

Two measures used in this study which were not used before were literacy and previous experience of any sort with the company. The definition of literacy was derived arbitrarily from certain test conditions, and the word is used in this report only as so defined. The first two items of Test 5, the arithmetical reasoning test, constitute a very simple measure of ability to read English, rather than of ability to reason. Anyone who can read them can solve them. Therefore an employee was classed as *literate*, (meaning "literate and able to read English"), if he could score in more than two items of this test, *non-literate* if he could not.

Previous experience with the company was regarded from two aspects. First, the length of the last previous period of service was recorded in months, and called *length of service*. This measure, although thoroughly tried out, did not yield any significant figures. Second, the length of time which had elapsed between the termination of the last previous engagement, and the beginning of the observation period was recorded in three-month intervals, and called the *length of interim*. This formed a scale ranging from no interim at all, (in the case of previously tested employees who were transferred from some other occupation into the given one), to a class "three years and over." The new employees formed a discontinuous group beyond that. This measure proved useful in a number of cases. No study was made of the influence of previous experience in the same occupation, except that in one group, where the number of employees who had had such experience was large, a subdivision was made, and the experienced and inexperienced workers were studied in two groups. Previous experience in the same occupation but with other companies was not studied at all, largely because of the difficulties of accurate recording of such data.

CRITERIA OF SUCCESS AT WORK

In the present study, early separation from the employ of the company was emphasized above all others as a criterion of failure in the given occupation. As in the preliminary studies, all causes of termination were grouped together except "laid off on account of lack of work,"[1] and this for reasons which have already been discussed at length. It should be noted, however, that the terminations for this study were recorded differently as to time. Instead of counting all terminations which had occurred up to a certain calendar date in the group of new employees, they were collected on the basis of the length of service of the individual. Thus the words "termination," or "early termination" as used in this report, mean "termination for reasons other than lack of work within six months of the date of hiring," and the expression, "rate of termination" means "the percentage of employees, hired for a particular occupation, who were terminated in this sense."

This criterion of success was the principal one used in the present study. Earnings were not used at all. Foremen's ratings, collected precisely as before, were used only as a secondary criterion and were much more simply handled. Instead of being corrected for individual foreman differences both in mean and in standard deviation, they were corrected for differences in mean only. Thus when subjects who formed a single occupational group were put together, although they might have served under different foremen, the average ratings coincided automatically. It was then usually possible to set off approximately half of the group, all of whom had higher ratings than the other half. These were known as *quality* or *high-rated* workmen. The correction of differences in mean was probably sufficient for this broad use of the ratings.

[1] Two other exceptions occurred rarely, namely, death of the employee and illness not connected with the adjustment of the employee to his work. Terminations for these two causes were not included in the criterion.

SUBJECTS

All of the male subjects of the earlier studies and all male employees hired during the second year of testing together formed the general sample of the present study, that is to say, all of the men and boys who were hired by the company from December 1, 1923 to December 1, 1925. When a tested individual was transferred to other work, or hired after a period of absence from the company (except when rehired to the same occupation after an interim of less than two months), he was regarded as a new subject.

Again, as in the preliminary studies, the problem of occupational classification was given most careful attention. With the sample increased to more than twice the size of the first year group it was possible to make much finer subdivisions than before, and therefore to increase the homogeneity of the groups studied. Whereas in the first year's work the occupational names were of the order "inspectors," "light machine operators," etc., they were now of the order "inspectors.

flat metal," "inspectors, manufacturing departments," etc.; "hand screw machine operators," "clock lathe operators," etc. Many of the skilled and semi-skilled groups which had been combined before, were large enough now to stand alone ("toolmakers," "machinists," etc.). It was still necessary to be extremely careful with regard to the exact meaning of the same occupational titles in different departments, but on the whole the classification was much easier to accomplish on this plane, and it was probably more accurate.

A certain amount of guidance in classification came from the statistical treatment of results in an entirely legitimate way. When calculation was begun it sometimes appeared that two of the occupational groups were statistically so nearly alike as to warrant their being combined. If this did not violate logical considerations, the combination was made. Sometimes, again, it appeared that for certain of the employment measures, let us say for the test scores in general, two logically related groups were much alike statistically, but were dissimilar in other measures,—age, schooling, etc. When this was the case, the two groups were combined until the first series of measures had been studied, and then they were separated. Occasionally a group which had seemed homogeneous to the classifiers, gave evidence under statistical treatment of being non-homogeneous. In this case the foremen were interviewed, and the work of the group was again analyzed. The result was either that a logical division of the sample into sub-groups large enough for study was made, or else that the records were put aside for the accumulation of more cases. Frequently, even after conclusions had been formulated for a given group, new facts were brought up in discussion which were important for classification. From all this it must be quite clear that the problem of classification of subjects for an investigation of this sort is not only an important, but also a relatively continuous issue.

The number of subjects in the occupational groups as here reported varied from 19 to 200. Only one of the groups had 19, and only two had more than 110 members.

Various omissions from the sample should be reported. Contrary to the practice in the earlier studies, no attempt was made this time to combine occupational groups which were logically different and too small for reliability. Such occupations were those of blacksmith, patternmaker, rigger, etc.; and all office groups except the factory time-keepers, checkers, and general clerks. For the time being they were omitted from the study. Two large groups were omitted because they yielded no reliable results under the statistical treatment used, and because it was recognized in the factory that the conditions of the particular occupations had changed so frequently in the past two years that the group could in no sense be considered homogeneous. Finally, a group of 366 men, spare laborers in the mills, was omitted because of an unsettled classification difficulty which need not be discussed here.

In addition to these, two groups which were studied will be omitted

from this report,—one is the group of buffers who had had previous experience in buffing with the Scovill Manufacturing Company, and the other is the group of toolmaking apprentices. So few of the experienced buffers had terminated within six months of their hiring dates that emphasis shifted to quality of workmanship as a criterion of success rather than termination, and the group does not come within the scope of this article. The toolmaking apprentices, on the other hand, were studied in a rather different way, giving results which are of sufficient interest for discussion in another article.

Even with these omissions, the occupational groups studied at this time numbered sixty-five, and the total number of men and boys involved was 3184.

Our description of these groups of new employees would not be complete without some mention of the strikingly wide range of final test scores, age, and schooling found in each one of them. In view of the fact that the employment policy of the company, during this whole period of testing, gave the foremen wide latitude in the selection of their own employees, and in view of the frequently expressed confidence of many of these men in their own ability to choose good men, it is a real surprise to find so wide a range as we do in the final scores of any given group. The total final score range for all incoming employees is from 60 to 200, yet 40 buffers range from 65 to 164, 24 electricians range from 117 to 189, and 37 teamsters and teamster's helpers range from 82 to 181. Ranges in age and schooling are also surprisingly wide. Table 1 show the ranges and the means for final score, age, and schooling, of seven groups selected at random from

TABLE 1

*Range of test scores and other measures in representative groups*

| 1 OCCUPATIONAL GROUP | 2 *N* | 3 FINAL SCORE | | 4 AGE | | 5 SCHOOLING | | 6 PER CENT TERMINATED | 7 LENGTH OF SERVICE |
|---|---|---|---|---|---|---|---|---|---|
| | | Range | *M* | Range | *M* | Range | *M* | | |
| Clerks | 72 | 125 to 176 | 154 | 16 to 44 | 23 | 7 to 15 | 10 | 27 | 10 |
| Crane Trailers | 34 | 80 to 168 | 133 | 19 to 48 | 27 | 2 to 11 | 7 | 38 | 6 |
| Floormen A | 86 | 85 to 167 | 132 | 16 to 54 | 25 | 0 to 15 | 7 | 44 | 7 |
| Toolsetters (Special) | 26 | 111 to 175 | 145 | 19 to 47 | 29 | 4 to 12 | 8 | 50 | 6 |
| Inspectors (Final) | 67 | 112 to 171 | 141 | 16 to 53 | 26 | 0 to 16 | 9 | 52 | 10 |
| Buffers (Inexperienced) | 40 | 65 to 164 | 120 | 16 to 47 | 31 | 0 to 12 | 5 | 60 | 2 |
| Inspectors, Foundry | 20 | 109 to 161 | 144 | 16 to 44 | 24 | 0 to 15 | 8 | 75 | 4 |

The groups here shown were chosen at random from the whole list of occupations, and are typical. *N* = number of subjects. *M* = arithmetical mean. Figures in Columns 4 and 5 indicate the number of years of age and schooling completed at the date of hiring. Column 6 shows the percentage of persons hired for the occupation who were terminated from the employ of the company for any reason except lack of work, within six months of the date of hiring. Figures in Column 7 give the average length of service in weeks of the terminated individuals.

the whole list. It also shows the number of individuals in the group, the percentage terminated, and the average length of service in weeks of the terminated members. The figures are entirely typical.

RESULTS

The treatment of results, which leads to the formation of placement scales, is statistically very simple. First, for each occupational group the scores in Tests 1 to 8 inclusive, the final score, and the other employment measures, were tabulated. Beside each class interval of employees hired, the number of terminations for the same class interval was entered, and the corresponding rate of termination calculated.

The successive rates of termination fluctuated in size, of course, and for every occupation some of the employment measures showed definite trends in termination rates. Either the termination increased with increasing scores, or it decreased, or it decreased for a time and then increased again.

The next step was to break up the distributions into critical sections. This was done by inspection, the limits of the sections, (the critical scores) being chosen so that the new termination percentage should represent its section fairly, and that each section should cover a pretty large proportion of the group.

It is an interesting fact that for most of the occupations there were several single measures which showed clear-cut preferred ranges, i.e., critical sections in which the percentage of termination was lower than for the group as a whole. There was great variation from group to group in the positions of the preferred ranges—high, medium, or low—in the scales. Apparently almost any high or low scores in the record of an individual would fall in some preferred range.

Combining the various significant measures for each occupation into one measure was the next process. This was done by adding together, for each individual in the group, the termination percentages of the critical sections in which his test scores, age, schooling, etc. placed him, just as if they had been scores instead of percentages.[2] When completed for all individuals in the group, the process gave a new set of scores—combined scores now. The subjects were distributed along this new scale, and again the termination percentages and critical sections were worked out. The preferred ranges of these scales showed very much lower termination percentages than those of the whole occupational group.

In practice the combinations of the apparently significant single tests were not made in one step as described above. Instead, first two were combined, then a third added, and so on. The procedure was a trial and error method for getting the best combination. If a single test when added did not improve the combined scale already formed, in the sense of lower-

[2] Freyd, Max. *Measurement in Vocational Selection*. Journal of Personnel Research, 1923, Vol. 2, p. 283.

*Public Personnel Studies*, 1925, Vol. 3, pp. 202–209. Method of combining measures, editorially attributed to Miss Gertrude V. Cope, Manager of the Sales Research Division, Phoenix Mutual Life Insurance Company.

ing the termination rate in the preferred range or increasing the number of individuals included in it, the measure was dropped. In this process it was possible to determine the effect of weighting any of the measures.

In order to test the reliability of the critical sections in the combined scales thus found a formula given by Yule and suggested by Freyd[3] was used:

$$\epsilon^2_{01} = \frac{p_0 q_0}{n_1 + n_2} \cdot \frac{n_2}{n_1}$$

where $p_0$ is the proportion of the whole group terminated, $q_0$ the proportion not terminated, $n_1$ the number of subjects in the critical section under question, $n_2$ the number in the whole group less that section. If the difference between the termination rate for the whole group and that of the preferred range was not at least three times its standard error, $\epsilon$, the combined scale was not accepted.[4]

Finally, the combined scales having thus been found on the basis of terminations, and tested theoretically for reliability, corroboration or criticism of each scale was sought in the foremen's ratings. We have stated that for nearly every group of employees, it was possible to set off approximately half who had higher foremen's ratings than had been given to the other half. These men were the quality workmen and their ratio to the whole group might be called the percentage of quality. The size of this percentage is arbitrary, but the corresponding percentages of quality in the critical sections are not, for they are the result of distribution. If they are high in the sections where terminations are low, and vice versa, then quality is in agreement with terminations.

As a matter of fact, close agreement occurred in a number of groups, though not in the majority, but wide disagreement was rare. For the most part the high-rated workmen as distributed along the scales showed differences in percentage which were too small to be reliable.

Figure 1 shows a typical series of single scales for an occupational group numbering 61 members, and the combined scale which was developed from them. Forty-one per cent of the men were terminated within six months (average length of service 6 weeks, not shown on the chart). In each of the scales the unbroken line represents the section or sections in which the rate of termination was lower than for the whole group, i.e., they represent the preferred ranges.

For this particular group, the significant single measures are Tests 2, 3, 8, schooling, and length of interim taken twice. The termination rate in the preferred range is 15 per cent, while one section of the preferred range has a zero rate. These figures are to be contrasted with the 41 per cent rate for the whole group, and also with the

[3] Yule, G. U. *Introduction to the Theory of Statistics*. London, 1917. p. 271.

Freyd, Max. *Measurement in Vocational Selection*. Journal of Personnel Research, 1923, Vol. 2, p. 277.

[4] In two cases lower reliability in the preferred range was accepted temporarily ($D/\epsilon = 2.8$ and $D/\epsilon = 2.9$). Termination rates for the non-preferred ranges were reliable.

The critical sections in the single employment measures from which the combined scales are constructed are not reliable in general.

TABLE 2

*Summary of data for occupational groups where significant placement scales were developed*

| OCCUPATIONAL GROUP | *N* | TERMINATION RATE | | *D/ε* | EMPLOYMENT MEASURES COMBINED |
|---|---|---|---|---|---|
| | | Whole group | Preferred range | | |
| | | *per cent* | *per cent* | | |
| Toolsetters, A | 35 | 14 | 0 | 7.0 | 4, 8, S |
| Machinists | 31 | 19 | 4 | 3.9 | 3, 8, A, 3 × S |
| Scratch Br. Oprs | 23 | 22 | 0 | 4.4 | 1, 2, 3, A |
| Electricians | 24 | 25 | 6 | 3.2 | 2, 3, 4, 5, 7 |
| Clerks, Factory | 72 | 27 | 12 | 3.5 | 2 × F, 2 × 8, Err. |
| Toolmakers | 48 | 29 | 0 | 4.6 | 2, 6, 7, Err. |
| Utility, Mfg. | 55 | 29 | 12 | 3.4 | 2. 3, 2 × 8, A, S |
| Tool Grinders | 28 | 32 | 0 | 4.6 | 1, 3, A |
| Inspectors, Rod & Wire | 36 | 33 | 16 | 3.1 | 2, 3, 2 × 8, 2 × L, I |
| Moldmen, Casting | 61 | 33 | 19 | 3.5 | F, A, S |
| Rollers, etc | 45 | 36 | 4 | 4.4 | 2, 3, 4, A, L. 2 × I |
| Bench Workers, A | 44 | 36 | 5 | 3.9 | 2, 3, 4, 8, A |
| Hand Screw Mch. Oprs | 53 | 36 | 8 | 4.0 | F, A |
| Heavy Press Oprs | 53 | 38 | 8 | 4.3 | 1, 3, 4, 8 |
| Crane Trailers | 34 | 38 | 14 | 3.7 | 1, 2, 3, 2 × A, S |
| Bench Workers, B | 39 | 38 | 16 | 3.7 | 2, 3, 4, 2 × 8 |
| Auto. Screw Mch. Oprs., B | 23 | 39 | 8 | 3.5 | 2, 3, S, I |
| Packers, Shippers | 28 | 39 | 17 | 3.1 | 2 × 5, 6, A, S |
| Hand Truckers | 60 | 40 | 20 | 3.3 | 3. 4, 8, A, S |
| Teamsters | 37 | 41 | 10 | 4.4 | 2, 3, A, L |
| Crane & Truck Oprs | 61 | 41 | 15 | 4.6 | 2, 3, 8, S, 2 × I |
| Annealers, Dippers | 38 | 42 | 0 | 4.7 | 1, 3, 4, A, S |
| Toolsetters, B | 33 | 42 | 11 | 4.0 | 1, 2, 4, 2 × A |
| Light Mch. Oprs | 59 | 44 | 0 | 4.9 | 1, 2, 3, A, 2 × I |
| Floormen, A | 86 | 44 | 22 | 5.5 | 2 ×2, 3, 4, 3 × 8, A |
| Painters | 42 | 45 | 6 | 4.3 | 2, 3, 2 × 4, 8, 2 × A |
| Tinsmiths, Ironworkers | 33 | 45 | 13 | 3.6 | 1, 3, 4, S, L |
| Dryout Oprs | 38 | 45 | 17 | 4.7 | 1, 2, 3, A, S, L |
| Tractor Oprs | 31 | 45 | 18 | 3.4 | 1, 2, 3, A, 2 × S |
| Floormen, B | 61 | 46 | 12 | 4.6 | F, 8, A, S |
| Headers & Reheaders | 108 | 47 | 32 | 4.5 | 1, 2, 3, 4, 5, S, 2 × L |
| Ashmen, Coalmen, A | 23 | 48 | 0 | 3.3 | 1, 2 × 2, 3, 1½ × 8, 2 × A |
| Scalemen | 23 | 48 | 14 | 4.0 | 1, 3, 4, 5, 8, S, L |
| Straighteners Helpers | 28 | 50 | 7 | 4.8 | 1, 2, 2 × 4, 2 × 8, S, A |
| Toolsetters, C | 26 | 50 | 14 | 4.0 | 1, 2, 5, 7, A, S, 2 × I |

TABLE 2—*Continued*

| OCCUPATIONAL GROUP | *N* | TERMINATION RATE | | *D*/ϵ | EMPLOYMENT MEASURES COMBINED |
|---|---|---|---|---|---|
| | | Whole group | Preferred range | | |
| | | *per cent* | *per cent* | | |
| Eyelet Mch. Oprs. | 32 | 50 | 14 | 3.6 | 1, 2, 4, A, I |
| Blockers, Stickers | 24 | 50 | 20 | 3.8 | 3, 8, A, S, I |
| Auto. Screw Mch. Oprs. A. | 48 | 50 | 33 | 3.4 | 2, 3, 2 × 4, 8, S, I. |
| Draw Bench Oprs. | 38 | 50 | 37 | 3.3 | 1, 3, 8, S, L |
| Milling Mch. Oprs | 39 | 51 | 7 | 4.4 | 6, 7, A, S, I |
| Fine Wire Oprs. | 43 | 51 | 17 | 4.9 | 2, 3, 4, A, S, L |
| Extrusion Helpers | 37 | 51 | 17 | 4.3 | 1, 2, A, S, L |
| Steamfitters | 35 | 51 | 25 | 2.9 | 1, 6, 7, A |
| Bull Block Oprs. | 200 | 51 | 27 | 4.1 | 1, 2, S. |
| Inspectors, Final | 67 | 52 | 13 | 4.9 | 1, 2, 3, 2 × 4, 8, A |
| Slitters, Trimmers | 42 | 52 | 15 | 4.6 | 1, 2, 3, 3 × 4, 2 × 8, S |
| Carpenters | 25 | 52 | 17 | 3.5 | 1, 2 × 5, A |
| Utility, Stores, Sanitary | 65 | 52 | 21 | 4.4 | 1, 2, 3, 8, S |
| Adjusters, (Bench) | 63 | 52 | 29 | 3.8 | 1, 2, 3, 4, 8 |
| Stringers | 191 | 53 | 29 | 6.0 | 1, 2, 2 × 3, 4, 6, 7, A |
| Muffle Helpers | 70 | 53 | 30 | 3.3 | F, 8, A, S |
| Utility, Salvage | 42 | 55 | 8 | 4.3 | 2, 2 × 3, 4, 8, 2 × S |
| Clock Lathe Oprs. | 35 | 57 | 6 | 5.7 | 4, 6, 2 × 8 |
| Floormen, C | 62 | 58 | 32 | 4.1 | 4, 8, S, L |
| Buffers, (Inexper.) | 40 | 60 | 15 | 4.1 | A, S |
| Inspectors, Metal | 39 | 62 | 44 | 3.6 | A, L |
| Coarse Wire Oprs. | 19 | 63 | 0 | 4.2 | 2, 3, 4, A, S |
| Rodfeeders | 49 | 63 | 15 | 4.0 | 2, 3, 4, 8, 2 × S |
| Hand Edgers, Knurlers | 72 | 64 | 49 | 3.6 | 1, 3, 4, 8, L |
| Moldmen, Foundry | 99 | 65 | 38 | 4.5 | 2, 3, 8, A, S |
| Coalmen, B | 24 | 67 | 33 | 3.4 | 1, 2 × 2, 3, 2 × 8, S |
| Laborers, Yard | 86 | 67 | 37 | 5.0 | 1, 2, 2 × 3, 3 × 8, A |
| Pointers | 34 | 68 | 44 | 2.8 | 2 × 1, A, S |
| Weighing-up men, Casting | 25 | 72 | 0 | 4.5 | 1, 3, 2 × 4, A, L, I |
| Inspectors, Foundry | 20 | 75 | 0 | 4.4 | 1, 2, 3, 4, 5, 6 |
| Total | 3,184 | .. | .. | | |
| Average per cent | ..... | 48 | 19 | | |

This table shows which employment measures are used in each placement scale, and the size and reliability of the termination rate in the preferred ranges.

*N* = number of subjects. *D* = difference in termination rate, whole group and preferred range. ϵ = standard error of the difference. *D*/ϵ should not be less than 3.

In the sixth column the abbreviations are as follows: 1, 2, etc., = Test 1, Test 2, etc., F = final score, A = age, S = schooling, L = literacy, I = length of interim, Err. = errors in Test 2. The symbols 2 × 5, 3 × L, etc., mean that the components coming from Test 5 are doubled, those from literacy, tripled, etc. Note that although this list names the measures involved in each scale, it does not indicate whether high, low, or middle values were preferred.

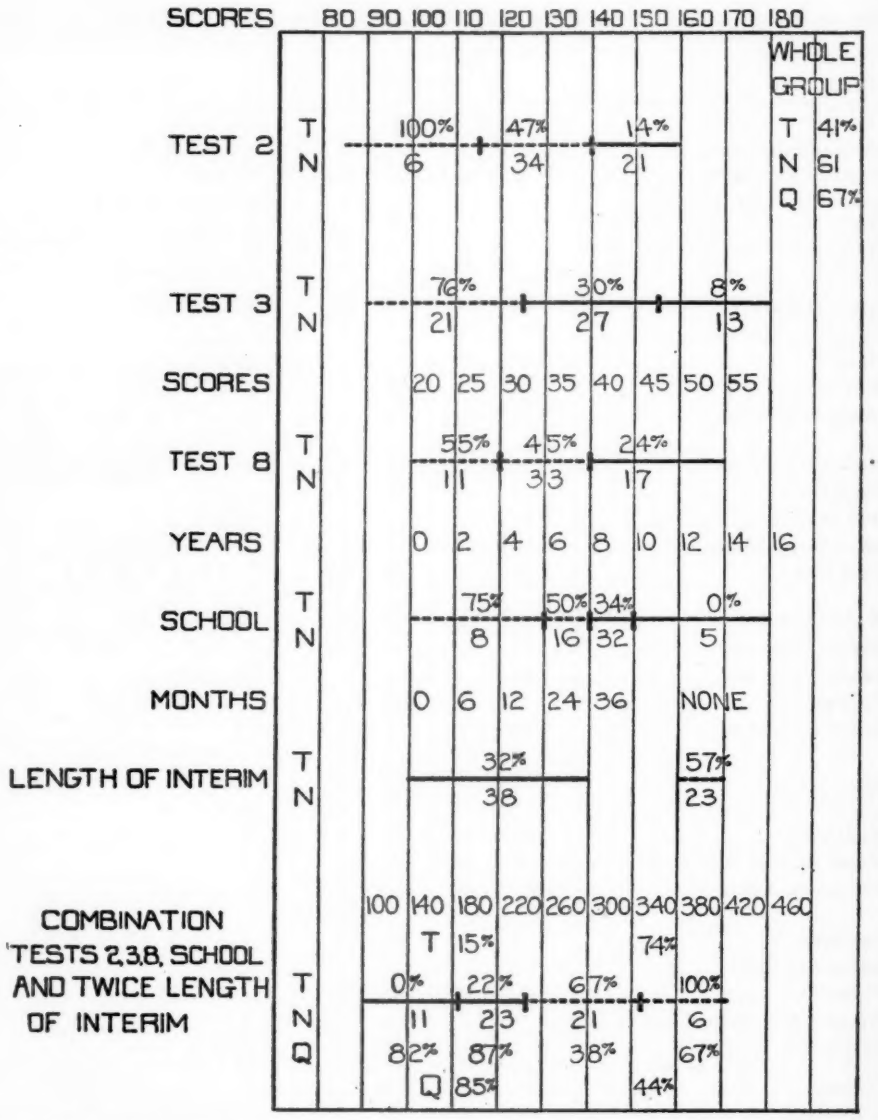


FIG. 1. A TYPICAL OCCUPATIONAL GROUP STUDY, SHOWING DISTRIBUTION OF 61 EMPLOYEES FOR FIVE SEPARATE MEASURES, ALSO FOR THE COMBINATION OF THE FIVE

$N$ = number of employees in group or sub-group. $T$ = per cent terminated. $Q$ = per cent rated as quality workers. Preferred ranges indicated by full lines; non-preferred, by broken lines. Of the critical scores indicated by short vertical lines, the most important one is 245 on the combined scale.

74 per cent termination in the non-preferred range. Quality is in agreement with termination, and 56 per cent of the group is included in the preferred range.

In the combined scales based on termination, the preferred range is always in the low scores, and gives no indication of the position of the preferred ranges in the single scales. This will not seem strange when it is recalled that the scores are sums of termination percentages, and low termination is favorable.

Table 2 and figure 2 give a convenient summary of the placement scales found for the sixty-five groups of employees studied. In the table the names of the occupations are given, the number in each group, the rate of termination for the group, and for the preferred range, the ratio of the difference of these two, $D$, to the standard error, $\epsilon$, and finally, the names of the tests and other measures which enter into each combined scale. It is interesting to note the great variation in the latter. Figure 2 presents graphically the data of columns 2, 3, and 4 of the table. Both in the table and in the chart the occupational groups are arranged in the order of their original termination rates. Names of the groups have been omitted from the chart, but they are available by reference to the table.

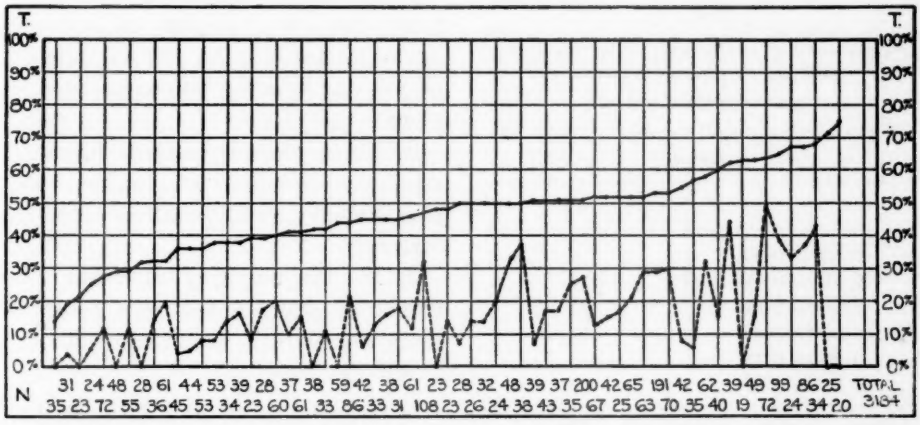


FIG. 2. CHART SHOWING TERMINATION RATE FOR EACH OF SIXTY-FIVE OCCUPATIONAL GROUPS OF MALE EMPLOYEES (CONNECTED BY SOLID LINES), AND TERMINATION RATE IN THE PREFERRED RANGE OF THE COMBINED SCALE DEVELOPED FOR EACH (CONNECTED BY BROKEN LINES)

$N$ = number of employees, each group; 35 in first, 31 in second, etc. $T$ = per cent terminated. Occupational names are given in table 2, arranged in same order.

As in the case of the crane operators and truck drivers illustrated in figure 1, most of the combined scales show more than two critical sections, and some show as many as five, with steadily increasing rates of termination From the two criteria of success one could also construct a combined scale, as follows:

Class 1. High rated men who did not terminate early.

Class 2. Low rated men who did not terminate early.

Class 3. High rated men who terminated early.
Class 4. Low rated men who terminated early.

To correlate this scale with the combined scale of scores is a rather forced expedient, but for the sake of whatever corroboration they may give to the reliability of the placement scales, coefficients for such correlations in sixty-three occupational groups are given in table 3. Two groups are omitted because they showed no distinctions in the ratings given by the particular foreman.

TABLE 3

*Distribution of coefficients of correlation of combined employment measures with combined criteria*

Sixty-three groups, numbering 19 to 200 people

| $r$ | $f$ |
|---|---|
| 0.80 to 0.84 | 6 |
| 0.70 to 0.79 | 13 |
| 0.60 to 0.69 | 15 |
| 0.50 to 0.59 | 14 |
| 0.40 to 0.49 | 10 |
| 0.30 to 0.39 | 5 |
| Total number..... | 63 |

In two of these correlations $r = 4 \times$ P.E. In all others $r = 5 \times$ P.E.

## CONCLUSIONS

Conclusions based upon the evidence here presented must be drawn with reserve. The groups of subjects are still predominantly small, the data complex, and the treatment of results open to error. Reliability is claimed for the combined scales while their components, the single scales, do not themselves meet the test of reliability. Moreover, any attempt to predict future relationships from these results must face the possibility that the larger variations in factory conditions have not been thoroughly sampled in a study of only two years' duration. We limit ourselves to the following conclusions:

1. It is possible to combine test scores and other employment measures, for certain groups of workers, so that they form a scale which bears an apparently significant and reliable relation to one criterion of success, namely, stability in the six month period immediately following employment.

2. This scale sometimes also bears a significant relation to another criterion, namely, quality ratings given by foremen.

3. In the majority of cases, the combined scales based upon terminations are neutral with respect to the quality ratings.

So much for the technical conclusions. With regard to the application of such scales to employment procedure, a freer, experimental attitude may be taken. If the scales are used with discretion, not as arbitrary and mechanical sieves but as sources of information supplementing the interview, then application to practice even at this stage is justifiable. It stimulates investigation by accelerating suggestions and criticisms from the local field, and it can do no serious harm. The latter statement is substantiated by two considerations. In the first place, it might be feared that use of the scales in hiring, although possibly reducing the number of terminations, would

interfere with the quality of workmanship, but this is not indicated by the data since quality as shown by the foremen's ratings is so little affected. More often, a standard which selects workers who will stay on the job for at least six months, selects also a larger proportion of abler workers. In the second place, injustice to individuals, which is rather widely feared in connection with testing, is not a hazard, both because interviewing still has weight in selection, and because of the variety already noted in the score requirements of the various scales. Almost anyone who would have been employed under the earlier procedures can still qualify for placement in some one or other of the occupations studied. In other words, the new process of selective placement does not substantially reduce the available labor market. What it does promise to accomplish is better placement within the factory of these who are hired, with greater satisfactions to the workers and resulting economies in reduction of labor turnover.

On the basis of the technical conclusions here presented, the combined scales for the sixty-five occupations are now being used provisionally in the employment procedure of the Scovill Manufacturing Company.

*(Manuscript received December 13, 1926.)*

# Book Reviews

## THE MEANING OF PSYCHOLOGY

*By C. K. Ogden. New York: Harper and Brothers, 1926. Pp. 326*

REVIEWED BY PAUL S. ACHILLES

The purpose of this book as stated in the preface is "to deal in the simplest possible language with the subject in the light of the most recent advances; and to deal with it more concisely than has been done by any comprehensive introduction hitherto." As Director of the International Library of Psychology, Philosophy, and Scientific Method, the author has special qualifications for such a task and he has achieved it admirably.

Almost anyone, from tyro to technician, would be attracted by the well-chosen chapter heads and sub-topics. And the author has a gift for intriguing introductions. He begins his book, for example, by saying, "there are four and a half good reasons for studying psychology seriously;" and later his chapter on "Mental Growth in Man" starts off with these sentences: "That apish cousin of the chimpanzee from whom we descend probably differed from him in two important respects as well as in matters of degree. One was that he developed free images, and the other that he took to using speech." Being thus intrigued to each chapter the reader is not disappointed with what follows. It is neither spoon-fed nor pedantic, tepid nor partisan; but clear straightforward presentation of the particular problems to be considered and fair criticism of the theories proposed to solve them.

The general program of the book is as follows. After presenting the reasons for studying psychology and a preliminary survey of the field, the author at once comes to grips with the inevitable problem of Mind and Body, or "What is the mind?" This serves to introduce a discussion of method and the two main lines of attack involved in psychological investigation, namely, "study of the body and the nervous system by observation and the technique of the neurologist, and study of the mind by what is known as introspection." The latter, according to the author, furnishes clues without which neither neurology nor physiology would have got far on the road, and using these clues, he proceeds first with the "neurological account" in three readable and up-to-date chapters on "Impulse and Inhibition," "How the Brain Works," and "Purpose and Interest." Then he makes a unique and unfortunate detour. He says, "The remaining transactions of the nervous system, notably those involved in pleasure and pain, in reasoning, and in the phenomena of deliberation, resolve, belief, prejudice, and suggestion will be discussed at a later stage when the introspective account of the mind is before us. Emotion will also be treated separately, and this account (i.e., the chapters mentioned above) of the incomings and outgoings of the central nervous system is thus not complicated by a discussion of that other nervous system known as the involuntary or sympathetic (autonomic) which is essentially concerned with our vegetative life." Although the chapters immediately following are highly entertaining and valuable, one feels a bit that the detour has been made to enjoy the better scenery along the way, rather than to avoid difficulties on the highway. It is a little hard to pick up the

promised discussions when they do appear later. Emotion is postponed to Chapter XIV. This is followed by chapters on "How the Mind Goes Wrong" and "The Abnormal," and then as though to end on a pleasanter note, a final chapter is on "Looking Forward." One's interest might have been better sustained by saving more of the attractive scenery till the last.

The chapters on "The Growth of the Mind in Animals" and "The Mentality of Apes" are certainly to be relished. The former flows easily from instincts to intelligence and the process of learning, with careful criticism of Thorndike's theories and concise but clarifying paragraphs on the *Gestalt* theory of perception. The chapter on apes is illustrated with interesting photographs of Köhler's and of Kohts' chimpanzees. It discusses further the development of intelligence and the needs that prompt activities, and then critically evaluates various theories and classifications of instincts, especially McDougall's. There follow chapters on "Mental Growth in Man," "Man's Linguistic Heritage," "Behavior," "Looking Inwards," "Looking Outwards," and "How We Think." The reviewer is tempted to comment on each of them but will attempt instead a more general evaluation.

To personnel workers and others engaged in the routine of business and industry the chief value of the book lies in its refreshing outlook and the rare opportunity it affords for getting out of the ruts and sidetracks in psychology. Few single books so enrich one's background, and psychological background of this sort is needed to offset one's prejudices and tendency to over-absorption in his own particular specialty.

To some there may seem to be disappointing gaps in the contents, particularly the very casual mention of mental tests. This the author foretells in the preface stating that the statistical handling of intelligence tests cannot be usefully described in brief compass and advising the reader to go direct to the original authorities cited in the appended bibliography. But we find the bibliography limited to "books representative of modern psychological opinion in the various fields covered in outline by the present work, and as likely to be of service to the general reader for the further study of contemporary psychology." Certainly it would not have been amiss to offer some references to applied psychology here, and it is surprising to find omitted such names as Cattell, Terman, Thurstone, and others in America, as well as Spearman, Myers, and others with allied interest in England.

Since the author leans decidedly toward emphasis of the dynamic aspects of psychology it seems also to the reviewer that the writings of Woodworth should have received fuller mention. Freud and Watson are credited with giving academic psychology some "salutory shocks." To Woodworth should go much credit for restoring its balance and keeping it steadily on the path of sane progress.

Perhaps the most nearly comparable book is Everett Dean Martin's "Psychology, What It Has to Teach You About Yourself and Your World." The two might well be read together. Ogden's book is more compact, up-to-date, and expressive to definite opinions. Both, however, suggest self-knowledge as the essential meaning and value of psychology. To quote Ogden's closing sentences, "But we must dare to be wise, and the way to wisdom lies through knowledge of ourselves. The facts which we can least afford to neglect are those which it is the object of psychology to present."

## MENTAL TESTS

*By Frank N. Freeman. Boston: Houghton Mifflin Company, 1926. Pp. 503*

REVIEWED BY MAX FREYD

In his introduction to this volume Ellwood P. Cubberley gives its purpose admirably:

"For the educational tests we have for some time had a number of well-organized teaching texts covering the field, so that

the student has been able to find, in the compass of a single volume, a good statement as to the nature, usefulness, technique of giving and scoring, and norms of the more important educational tests. For the field of mental tests, on the contrary, we have until now had no such comprehensive single volume. It is this lack that the author of the present number in this series of textbooks has aimed to supply. What Monroe, DeVoss, and Kelly have done so well for the first phase of the test movement in their *Educational Tests and Measurements*, the author of the present volume has now done for the field of mental tests."

The measurement of intelligence is naturally a predominating topic in this volume. The author has covered the Binet tests, point scale tests, and other tests of intelligence; he has included chapters on the relation of intelligence to delinquincy, the interpretation of intelligence tests, and the nature of intelligence; and he gives a table of important facts concerning the chief group intelligence tests. Other topics covered in the volume are analytical tests, personality tests, technique and theory of mental tests, and the use of mental tests in education, vocational guidance and selection, and in clinical work.

In a volume of this scope some of the chapters are bound to suffer from sketchy treatment. The chapter on personality probably suffers the most from the necessity to be brief and elementary. Too much relative attention is devoted to the Downey Will-Temperament Test; and no mention is to be found of the Kent-Rosanoff Test or the recent developments of May and Hartshorne. The wisdom of including questionnaires in a volume on mental tests is doubtful. But having devoted a few pages to the interest analysis blank used by Hornell Hart, the author fails to credit the group at Carnegie Institute of Technology with its part in the development of this type of questionnaire.

As an introductory text the volume serves its purpose well. Its weaknesses are not serious, and for one who wishes to pursue the subject further the inadequacies and faults are soon remedied. It occupies a unique place and should find wide acceptability as a beginner's book on psychological tests.

# New Books

Analysis of the Printing Trade. Los Angeles: University of Southern California, 1926. 38 p.

Artman, C. E. *Food Costs and City Consumers; Significant Factors in Metropolitan Distribution of Perishables.* New York: Columbia University Press, 1926. 170 p. $2.25.

Ashby, Lucy E., and Earp, Kate A. L. *Health Visitor's Guide.* Chicago: Chicago Medical Book Company, 1926. 131 p. $1.20.

Benn, E. J. P. *If I Were a Labor Leader.* New York: Chas Scribner's Sons, 1926. 154 p. $1.75.

British Institute of Adult Education. *Handbook and Directory of Adult Education.* London: H. F. W. Deane and Sons, 1926. 190 p. 3s 6d.

Britten, R. H., and Thompson, L. R. *A Health Study of Ten Thousand Male Industrial Workers.* (Public Health Bulletin Number 162.) Washington: Government Printing Office, 1926. 175 p. $0.30.

Cabot, R. C., M.D. *Adventures on the Borderland of Ethics.* New York: Harper and Bros., 1926. 150 p. $2.00.

Catlin, W. B. *The Labor Problem in the United States and Great Britain.* New York: Harper and Bros., 1926. 669 p. $3.50.

Columba, M. *A Study of Interests and Their Relations to Other Factors of Achievement in the Elementary School Subjects.* (Catholic University of America, Educational Research Bulletins, Volume 1, Number 7.) Washington: Catholic Educational Press, 1926. 35 p.

Cox, Catherine M. *Early Mental Traits*

*of Three Hundred Geniuses.* (Genetic Studies of Genius, Volume 2.) Stanford University, Cal.: Stanford University Press, 1926. 852 p. $5.00.

DEBLOIS, LEWIS A. *Industrial Safety Organization for Executive and Engineer.* New York: McGraw-Hill Book Company, 1926. 328 p. $4.00.

EDGERTON, A. H. *Vocational Guidance and Counselling.* New York: Macmillan Company, 1926. 213 p. $1.60.

EVANS, O. D. *Educational Opportunities for Young Workers.* New York: Macmillan Company, 1926. 391 p. $3.00.

FILENE, CATHERINE. *Careers for Women.* Boston: Houghton Mifflin Company 1926. 576 p. $2.00.

FOERSTER, R. F., AND DIETAL. E. H. *Employee Stock Ownership in the United States.* Princeton: Industrial Relations Section, Princeton University, 1926. 174 p. $2.00.

FREDERICK, J. GEORGE. *Modern Industrial Consolidation.* New York: Frank-Maurice, 1926. 397 p. $7.50.

FREEMAN, FRANK N. *Mental Tests.* Boston: Houghton Mifflin Company, 1926. 503 p. $2.40.

HAMILTON, W. I., AND KIDNER, T. B. *Advising the Tuberculous About Employment.* Baltimore: Williams and Wilkins Company, 1926. 171 p.

HAZLITT, VICTORIA. *Ability. A Psychological Study.* New York: Macmillan Company, 1926. 147 p. $1.80.

LAUCK, WILLIAM JETT. *Political and Industrial Democracy, 1776-1926.* New York: Funk and Wagnalls, 1926. 384 p. $2.00.

LEUCK, MIRIAM S. *Fields of Work for Women.* New York: D. Appleton and Company, 1926. 349 p. $2.50.

LINCOLN, E. E. *Steps in Industry.* New York: Macmillan Company, 1926. 229 p. $2.00.

LINDEMAN, E. C. *The Meaning of Adult Education.* New York: The New Republic, 1926. 242 p. $1.00.

LOTT, M. R. *Wage Scales and Job Evaluation.* New York: Ronald Press Company, 1926. 162 p. $5.00.

MAVERICK, LEWIS, A. *The Vocational Guidance of College Students.* Cambridge, Mass.: Harvard University Press, 1926. 251 p. $2.50.

MURRAY, J. W., M.D. *Examination of the Patient and Symptomatic Diagnosis.* St. Louis: C. V. Mosby, 1926. 856 p. $8.50.

National Industrial Conference Board. *Wages in the Unites States.* New York: National Industrial Conference Board, 1926. 163 p. $2.50.

OGDEN, C. K. *The Meaning of Psychology.* New York: Harper and Brothers, 1926. 326 p. $3.00.

PERIGORD, PAUL. *The International Labor Organization.* New York: D. Appleton and Company, 1926. 339 p. $3.00.

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WINSLOW, C. E. A. *Fresh Air and Ventilation*. New York: E. P. Dutton and Company, 1926. 182 p. $2.00.

WRIGHT, J. C., AND ALLEN, CHAS. R. *The Administration of Vocational Education, of Less than College Grade*. New York: John Wiley and Sons, 1926. 436 p. $3.00.

WYCKOFF, VERTREES, J. *The Wage Policies of Labor Organizations in a Period of Industrial Depression*. Baltimore: Johns Hopkins Press, 1926. 119 p.

# Abstracts

*The Evolution of Personnel Management.* WALTER J. MATHERLY. Industrial Management, 1926 (October), Vol. 72, 256–257.

A discussion of beginnings of the factory system, twentieth century methods, and effects of the World War and post-war reaction in the field of personnel management.

Mr. Matherly is a Professor of Business Administration in the University of North Carolina.

*Personnel Administration in the University.* E. E. LINDSAY. School and Society, 1926 (September 25), Vol. 24, 375–382.

Describes a method by which the Personnel Administration of the large university may keep an adequate and current check on individual faculty members. By the use of a simple, easily handled personnel record sheet showing at a glance the services now being rendered and similar services for previous years, including training, experience, salary, etc., a cumulative current record is always available. From this record it is possible (1) to make a rapid computation of instructional and other salary costs, (2) to equalize faculty loads, and (3) to measure success and determine promotions.

*Improving Human Relations in the Transportation Industry.* A. J. COUNTY. Railway Age, 1926 (September 11), 455–459.

Discusses the human relations work of the Pennsylvania Railroad. Explains the relief department, the pension department, the provident and loan association, and the mutual beneficial association of this railroad. Describes how the Women's Aid, the Y. M. C. A., and employee representation have aided in bringing about harmonious relations between men and management.

The annual turn-over in the force has been reduced by about 75 per cent in the last few years, and is now confined largely to unskilled labor and to the few who are willing to take temporary jobs while preparing for other work. Among such men as foremen in all ranks, engineers, conductors, firemen, clerical supervisors, etc., the turnover is practically zero.

*Use of Cost-of-Living Figures in Wage Adjustments.* HELEN F. HOHMAN. Journal of Political Economy, 1926 (August), Vol. 34, 525–530.

The two purposes of cost-of-living figures are: (1) To establish a steady rate of real wages, and (2) to determine a "fair" or "living" basic wage. Describes use of United States Bureau of Labor Statistics index numbers in practice for a few general cases. Presents problem of adjustments for falling price period. Cost-of-living figures are a valuable guide in securing increased wages or in mitigating wage cuts, especially for the very low paid groups.

*Selection Tests on the German Railways.* F. GLASEL. Journal of the National Institute of Industrial Psychology, 1926 (October), Vol. 3, 201–204.

In Germany scientific methods of vocational selection and guidance have been extensively applied. Psychological tests are widely used by the Saxon State Railways. These tests have proved successful, and today there are three laboratories established by the Deutsche Reichsbahn in Dresden, Munich and Berlin. Special examinations for every department of railroad work aim to measure (1) physical conditions, (2) intelligence and special aptitudes, and (3) will-power, which includes such qualities as industry, reliability, and conscientiousness. Ten different (quality) tests are here explained and discussed.

*The Relation of Nationality and Religion to Income of Women Clerical Workers in Buffalo.* NILES CARPENTER AND M. E. WAGNER. Social Forces, 1926 (September), Vol. 5, 140–146.

Deals with the results of an investigation carried on during the past year by the Department of Sociology of the University of Buffalo to determine the relation of race and nationality to economic progress of women clerical workers. The investigation is based on the records of a group of employment offices devoted to placement of clerical workers in the City of Buffalo. The most important conclusions derived are as follows:

1. Earning power increases directly with experience.

2. Earning power increases with the securing of a high school education.

3. Americans are found to be distinctly superior in earning power to all other groups, when experience is taken into account.

4. The English, Irish and Canadians are only slightly below the Americans in earning power, when experience is taken into account.

5. Of the non-English speaking immigrant groups, the Jewish workers are somewhat superior to the others, the Germans and Scandinavians, the Poles and Italians being approximately equal.

6. There is some suggestion that Protestant women have an advantage in earning power over both Catholic and Jewish women.

7. There is no evidence that the "old" immigration has an advantage over the "new," when experience is taken into account.

8. A certain discrepancy between median earning power and experience compared to mean earning power and experience suggests that the German, Polish, and Italian groups may be better suited for office work than the others in that they contain fewer individuals of markedly low earning power.

*Taking the Guesswork out of Selecting Managers.* H. G. KENAGY. Printers Ink Monthly, 1926 (September), Vol. 13, 102–103.

Describes and illustrates a form and rating scale used by Armour and Company for the selection, promotion, and training of their managers and salesmen. Each branch house manager, in company with his district superintendent, fills out this form for each employee who has any connections with sales. Upon receipt of these forms from the branch houses the company home office has a complete and carefully classified file for promotional purposes. The sales manager of each house also sends to the home office a list of available men who might fill certain jobs successfully. On the basis of these two records (combined), promotions, selections, and necessary training are decided upon.

*Quality Rating as a Basis for Promoting Employees.* F. M. PEPPER. Vocational Guidance Magazine, 1926 (October), Vol. 5, 22–28.

Discusses the advantages of grading employees systematically, and describes the methods used in the Plant Department of the Illinois Bell Telephone Company. The young men chosen are recruited by careful selection from high schools and colleges before graduation. At the end of a period of studentship, the employee is given a direct assignment. Supervising employees are required to report on each employee by Progress Reports, which include ratings on adaptability, production, personality, application, comprehension, and mechanical ability. In addition a history card is kept, showing the age, education, occupations, wages, accident and sickness record, attendance record, and employee's rating as determined by qualification tests.

Qualification tests are divided into grades according to experience and length of service. The grades are D, C, B, A. Grade "D" is the apprenticeship period and usually covers two years. The questions and problems used in the tests are practical, being made up from specification books, working method bulletins, etc. Committees of workmen who review tests are inclined to be more strict than the management.

Although there was some opposition, particularly from the older employees, when the tests were instituted, they are now

considered fair and beneficial in that they eliminate favoritism. The tests have done much toward education of workmen. There is better attendance at evening schools, and a good general improvement in quality and quantity of work.

*Training Tile Setting Apprentices.* LAYTON S. HAWKINS. Journal of Educational Research, 1926 (September), Vol. 14, 133–141.

A brief description of the way the Associated Tile Manufacturers proceeded to study the training problems of their industry, and to determine: (1) Major operations, (2) work and type jobs, (3) learning order, (4) teaching material.

The preparation of lesson material with performance and related technical information is outlined. The basic course consists of two parts: (1) Specific directions for the performance of nineteen selected type jobs, with only as much technical information as would be necessary to learn to perform these jobs understandingly; (2) a body of related technical information which generalizes the experience gained from performing these type jobs. The teaching material was tried out on: (1) Experimental day school, (2) part-time trade extension school, (3) evening trade extension school, (4) individual apprentices. Students were further ahead at end of their three months of training than the average apprentice is at end of two years of service.

*Vocational Adjustment Through Adult Education.* C. V. THOMAS. Vocational Guidance Magazine, 1926 (November), Vol. 5, 76–79.

Maintains that one of America's greatest social and economic needs is the vocational adjustment of adults who enter industry untrained and unguided.

Studies of vocational demands in Cleveland contrasted with vocational supply indicate (1) that the masses of men enter industry untrained, and (2) that industry needs more trained men than the present school facilities are providing.

Wage earners paid $25,000,000 for correspondence instruction in a single year. Thirty-eight universities conduct evening schools to meet demand of adults for higher education. Grown men appreciate the value of training.

Concludes (1) that there is a great need for vocational adjustment of adults, (2) that large numbers seek this adjustment through education, (3) that trained adults have an opportunity for vocational adjustment, and (4) that adult education brings advantages in the attitude to learn, the experience and the understanding of economic conditions of its students.

*We Stopped Taking Chances on Our Future Executives.* A. D. CURTIS. Sales Management, 1926 (October 30), Vol. 11, 701–702, 773.

Describes training of young men. College men are paid $100 a month to start, with a raise every three months for the first year. During this year every man is trained in each of the ten departments of the Curtis Lighting Company. Two lectures a week are given by department heads and by making these lectures available in written form, the department head is prevented from doing a slip-shod job. The men are required to take notes and pass examinations at the end of each five week period.

Of the first ten, eight are still employed by the company. Three are associate field engineers, one is a full-fledged field engineer in charge of a territory, two are in the engineering department at the home office, and two have responsible positions at the factory. Of the second class, which started in the summer of 1925, nine are left. Four are associate field engineers, one is in the designing department, one is in the engineering department, and though two others are technically not in the employ of the company, they are servicing its goods for two important customers.

This training plan involves an investment of $15,000 a year in salaries but is felt to be well worth while.

*Getting Salesmen to Come Out of the Audience at Conventions.* C. B. MATHES. Printers Ink, 1926 (October 28), Vol. 137, 65-68.

"There are two distinct kinds of sales conventions: One at which the executives

or imported speakers do all the talking; the other at which the salesmen are given an opportunity to participate." Describes advantages of the latter type. Says that Conklin Pen Manufacturing Company sends questionnaires to salesmen and from this information next year's program results. Some time before the convention the program is sent each salesman. Certain salesmen write papers covering an activity in which they have excelled and present them at the convention. Talks by executives and advertising counsellors are brief and to the point. A unique and valuable feature is the salesmen's executive meeting behind closed doors. A report is made to the company outlining the recommendations of the meeting and all reports are unanimous. The company attempts to adopt the recommendations as far as possible.

*Why Not Speechless Sales Conventions.* PERCY H. WHITING. Printers Ink, 1926 (October 7), Vol. 137, 10–12.

Generally the weakest feature of a sales convention is "the speeches." The good points of almost any speech could be summed up in one or two paragraphs. After three years in which conventions were reduced from 100 per cent oratory to less than one tenth of one per cent the author concludes: (1) A speech is probably the worst possible way of getting material across; (2) a much better way of bringing ideas into the minds of your salesmen or sales executives is through a directed round-table discussion. The plan used for directing the discussion is: (*a*) List the points you wish to discuss; (*b*) determine what, under these headings, you want to sell your men; (*c*) reduce the big questions into a number of smaller and simpler ones. "Think letters" are sent at intervals before the convention and each man must come prepared with answers to all the questions. Meetings are stenographically reported, and helpful facts are sorted out of these minutes. The question convention requires sustained attention and hence should frequently be broken up with some form of mental relaxation. Nine suggestions for conducting question conventions are: (1) Have a hard-boiled chairman; (2) treat 'em rough; (3) have the seats bunched; (4) avoid interruptions; (5) have several interlocutors, one soon wears out; (6) have an elastic schedule; (7) don't lay out too much; (8) move at high speed; (9) don't attempt this kind of convention if work is repulsive to you.

*Why Not Have Special "New Account" Salesmen.* C. C. CASEY. Printers Ink, 1926 (October 28), Vol. 137, 209–210.

States an instance in which several sales executives discussed the possibilities of establishing a "new account" salesman in connection with the "old account" salesman. The viewpoints of the various executives are given, both for and against the idea. The various difficulties that would be met are discussed. An illustration is given by one executive in which the plan had been tried. The results of the trial are given. A method of adjusting the compension is given in connection with the transferring of the new account salesmen into old account salesmen as the demand necessitated. A proposed solution is given for selling the new ideas to the board of directors. Final advice is given not to try the plan unless it has been figured out scientifically first, and conclusive evidence found that it will work. A detailed method of analyzing each particular situation is given.

*Accidents in Industry.* A. STEPHENSON. Journal of the National Institute of Industrial Psychology, 1926 (October), Vol. 3, 194–200.

Much has been done towards preventing machine accidents by the use of mechanical guards. Ninety per cent of present day accidents are accounted for as failures on the part of the human subject. Consequently, the problem of accident-prevention today is largely a psychological one.

Discusses the factors bearing directly on this problem, some of which are age, ex perience, dexterity, artificial light, selection (by tests), training and emotional stability.

# News Notes

## PERSONNEL RESEARCH FEDERATION

### *Activities of Member Organizations*

### *Princeton University*

The membership of Princeton University includes both the *Industrial Relations Section* and the newly organized *Department of Personnel*. Mr. Philip Brasher, in charge of the Department of Personnel, will represent Princeton University as a corporate member of the Personnel Research Federation.

The following statement, which is taken from a recent announcement of the Industrial Relations Section, shows openings for coöperation by other members of the Personnel Research Federation.

"The Section combines the work of a library, a clearing house, a research bureau, and an adjunct to the teaching faculty of the Department of Economics and Social Institutions of Princeton University. Such a combination is necessary, it is believed, to satisfy the needs of the students, executives and labor officials interested.

"As a library, the Section collects, classifies and indexes periodicals, books, pamphlets, and unpublished memoranda obtained by purchase, correspondence, and field investigation. Executives, labor officials, and research workers have made use of this material which is so organized as to provide easy approach to any subject of study within the field of industrial relations. As a clearing house, the Section answers specific inquiries from interested persons throughout the country. It acts as a research bureau in the preparation of comprehensive, descriptive reports on subjects of general interest from the material in its possession. These reports are sold at cost of publication and the Section bears from its endowment the expenses for research and preparation of the manuscript.

"It is one of the aims of the Section to assist students during their college training to grasp the problems of labor direction and leadership. In acting as a clearing house of information as to how employer-employee problems are being met in the industrial establishments of the country, it comes into possession of authoritative up-to-date material which is invaluable in the training of students in this field. The Director of the Section is a member of the University faculty and brings to the students the experience gained in the Section's activities. Undergraduate students and graduate students at Princeton use the Section's material and facilities in the preparation of studies and reports. The material and facilities are open to use by graduate students in other institutions as well.

"The range of subjects covered by the material organized in the Industrial Relations Section may be suggested by the following titles, which include but a small fraction of those covered. Each item is catalogued according to both subject and source. Catalogue entries now exceed twenty thousand.

Absentees
Accident prevention
Adjustment of disputes
Apprentice training
Arbitration
Benefits
Bonuses
Collective bargaining
Credit unions
Discharge
Employee magazines
Employee representation
Employers' associations
Employment guarantee
Employment methods
Fatigue
Foreman training

Hours of work
Housing
Impartial chairman methods
Insurance, individual and group
Job analysis
Labor banks
Labor turnover
Legal aid
Meditation
Mutual aid plans
Overtime
Pensions
Personnel administration
Profit sharing
Quitting
Stock ownership
Strikes
Suggestion systems
Thrift plans
Trade agreements
Trade union policies
Trade union constitutions
Unemployment
Union label
Wage determination

"The Section receives regularly approximately seven hundred periodicals, including five hundred and fifty employee magazines, seventy-seven trade union journals, sixteen labor newspapers, eleven government publications and about forty miscellaneous periodicals. These are carefully scanned as they appear for indications of new developments and for important articles, which are immediately catalogued. Additional information and printed material on the developments which are noted in these and other sources is obtained by correspondence. The Section reinforces this method of keeping up to date by sending questionnaires to selected groups from time to time. It also coöperates with many other research organizations and authorities from whom it obtains reports and books on labor subjects. Aa a final check on these sources, the Section makes investigations by which supplementary information is gained first hand on practical conditions in employer-employee relationships. By this means the Section's material is kept alive to the rapid changes in the field.

"The Section receives many kinds of requests for information and an endeavor is made to answer fully all specific inquiries. These requests come from many sources outside of Princeton and a few may be suggested. Recently a company manufacturing household equipment asked for information concerning certain limitation clauses in mutual benefit association plans. A department store wanted to know how its vacation plan compared with plans of similar companies. The manager of an automobile manufacturing plant sought the best published sources of information on certain phases of personnel management. The superintendent of a large company manufacturing druggists' supplies came to gain information in the preparation of a pension plan. A labor official wished to know the most recent conditions of labor banks, and a publicist obtained material on stock ownership by employees. Graduate students have visited the Section to secure data on trade union financial enterprises, and only recently a college professor made inquiries concerning a particular point in trade agreements.

"The Industrial Relations Section has recently published a report "Employee Stock Ownership in the United States" which summarizes and analyzes its information on this subject. The book is sold at the cost of publication, $2.00 for a cloth bound edition and $1.50 for a paper bound edition. Other reports will be published from time to time on subjects of importance. It is the policy of the Section to limit the number of such reports to insure a high quality of workmanship. Announcements of the Section's publications will be sent to interested persons."

### WELFARE PROBLEMS IN NEW YORK CITY

The Welfare Council of New York City has published a monograph on welfare problems in New York City which have been studied and reported upon during the period from 1915 through 1925. Reference is made to more than five hundred studies, giving the problem, the investigator, the organization publishing the report, and the price. The sixty economic and industrial studies will be of special interest to personnel

workers. Investigations still in progress will be listed in supplementary booklets to be issued each year. This monograph may be obtained of the Welfare Council, 151 Fifth Avenue, New York City.

### ILLUMINATION AND FINE WORK

The relation between illumination and efficiency in fine work (typesetting by hand) is the subject of a recently published joint report of the Industrial Fatigue Research Board and the Illumination Research Committee. It was found that work done by artificial light of 20 foot-candles most nearly approximates work done in daylight. "If the illumination is less than 2 foot-candles, nearly one quarter of the possible output is lost, while the number of mistakes is more than doubled, and the fatigue experienced by the compositors is materially increased. Even when the illumination is as much as 7 foot-candles—a value which is probably higher than the present general practice—over 10 per cent of the possible output is lost and there is an unnecessarily high percentage of errors."

A copy of this report may be obtained from His Majesty's Stationery Office, London, at 6d.

### PSYCHOLOGY IN INDUSTRY

The Psychological Bulletin for November, 1926, contains a review of the literature on vocational selection and other applications of psychology in industry, by Dr. M. S. Viteles, of the University of Pennsylvania. He reviews three hundred and sixty books and technical articles mainly in English and German, which have appeared within the past four or five years. This invaluable summary should be in the hands of every industrial psychologist.

# Aims of Retail Training[1]

By James H. Greene and Dorothy B. Walsh, *Research Bureau for Retail Training, University of Pittsburgh*

*Training aims are of importance in providing definite goals for training departments. There are two sources from which these aims may be obtained. One is an analysis of the aims of the store. Another is the opinions of experienced store executives. The technique of finding out these aims and making them definite in any store is here described.*

## INTRODUCTION

THE practical application of the results obtained by the Bureau on specific research problems is frequently hampered by the difficulty of making decisions on such general and constantly recurring questions as the following:

Should training be centralized or decentralized?

Who should be responsible for decentralized training?

What should be included in a training program?

What training methods should be employed?

What classes of workers should be reached by a training program?

Scattered and conflicting answers to some of these questions were to be found in the semi-popular literature of the field but the need for a fundamental study of both theory and practice remained evident. For this reason, as well as to bring up to date a course in the administration of training which the Bureau gives annually to its students, a study of the organization and administration of training in retail stores was undertaken in the fall of 1925.

A preliminary study of the problem, based upon experience, observation, and procedures employed in educational and business organization and administration, resulted in the division of the subject under the following six heads:

I. Aims of training
II. Personnel groups to be trained
III. Subject matter
IV. Methods
V. Organization necessary for training
VI. Administration
    a. Installation
    b. Maintenance
    c. Evaluation

In the first division, an attempt was made to set up the aims of retail training. The present article is a summary of the results obtained in

[1] This is a preliminary report on Division I of a general study entitled "The Organization and Administration of Training in Retail Stores" by James H. Greene and Dorothy B. Walsh, Research Bureau for Retail Training, University of Pittsburgh.

this connection together with a description of the technique employed. The second division will deal with the grouping of the personnel of a store for training purposes so that these aims may be realized. The subject matter necessary for each personnel group will be studied in the third division of the study. Methods best adapted for use with different groups and subject matter will be the subject of the fourth division. The fifth division will deal with the organization, the training department and those operating executives necessary to give training. In this division will also be included the ways in which such executives should be utilized. The sixth division deals with the administration of the training program, suggestions for the organization of which are embodied in the first five divisions. It may be divided into three subdivisions: *installation,* referring to the factors involved in inaugurating a training program; *maintenance,* involving the successful carrying on of the program; and *evaluation,* containing a discussion of the methods of measuring results and revising methods and procedure in the light of experience.

### THE AIMS OF RETAIL TRAINING

Much training in retail stores has come down from a period when training was thought of solely in terms of salescheck writing. If the curriculum makers in the various fields of education have considered it worth while to revise curricula in the light of new aims, it would seem to be profitable to study the problem of training aims in a retail store.

It may be stated at the outset, that it is believed that each store should set up its own aims, if only for the psychological effect on the store executives. Some assistance may be desired in doing this. It was with that thought in mind that the present study was made. The results may likewise be of interest to those workers in other fields of vocational training who may feel the importance of aims.

To the training program builder, aims should be considered as goals which will help him to devise programs whereby they may be attained. Too often the goals are hastily assumed and a training program becomes a fixture through usage. A broad, general aim which may be readily stated by anyone with a slight knowledge of the field will be of little assistance. What is needed is a list of specific aims which can be interpreted in terms of subject-matter and method.

While it may be true that one or two authorities might set down a list of aims, and such a list would necessarily carry weight, it is believed that other methods which will be described have produced data of more value.

In the first place it may be assumed that retailing has certain aims. In the economic scheme of affairs, the retailer performs certain functions. A study of these functions should disclose the aims of retailing. If the retail enterprise is to be considered successful these aims must be realized in large part. It may safely be assumed further that training should play a large part in their realization. The first part of this study was, there-

TABLE I

*Analysis of hypothetical aims of retailing for training implications*

*Aims of retailing*

I. To act as a center of distribution
  1. To gather goods from producers
    a. To determine what to buy
      (1) Consumer demand analysis
      (2) Essential qualities of merchandise
      (3) Style trends
    b. To determine where to buy
      (1) Market analyses
      (2) Price concessions
    c. To determine when to buy
      (1) Economic conditions
      (2) Traffic conditions
    d. To determine how much to buy
      (1) Perpetual inventories
      (2) Budgets
      (3) Balanced stocks
  2. To distribute goods to consumers
    a. Primary services to customers
      (1) Merchandise departments
      (2) Display of goods
      (3) Service of salespeople
    b. Secondary services to customers
      (1) Direct service to customers
        (a) Bureau of Adjustments—to take care of complaints, rectify errors, etc.
        (b) Shopping Bureau
        (c) Information Booths
        (d) Budget Bureau
        (e) Lost and Found Bureau
        (f) Check Rooms
        (g) Credit Department
        (h) Delivery Department
        (i) Rest Rooms and Lavatories
        (j) Restaurants
        (k) Writing Rooms
        (l) Telephone Facilities
        (m) Post Office Sub-station
        (n) Classes and lectures in dressmaking, millinery, embroidery, lamp making, cooking, etc., with special advisors and instructors
        (o) Style Advisors
        (p) Workrooms where merchandise such as carpets, ready-to-wear, draperies, awnings, etc., are adapted to the needs of the customer
        (q) Beauty parlors, travel, hotel and ticket service. These features were installed as a convenience to customers rather than as a direct means of profit making
        (r) Entertainments
      (2) Indirect service to customers, store maintenance, and conduct
        (a) Ventilating Equipment
        (b) Lighting Equipment

TABLE 1—*Continued*

(c) Traffic and Transportation (elevators, escalators, etc.)
(d) Cleaning of Building
(e) Fire Prevention
(f) Storing of Goods—the retailer must keep the goods in his store and those in the warehouse in a sanitary condition, preserve them from heat and cold, from decay, from fire, water, and any other form of destruction to which all goods are subject

II. To serve as a social community of workers
1. To provide broadly for the human needs of the employees
a. To provide good physical working conditions
(1) Reasonable hours in keeping with the minimum demands of the public
(2) Good ventilating equipment—warm in winter and cool in summer
(3) Clean, safe, and accessible facilities for keeping wraps, etc.
(4) Restaurants
(5) Rest rooms
(6) Hospital service and visiting nurse
(7) Dental service and Chiropody
b. To provide good mental and psychological working conditions
(1) Overtime only when absolutely necessary
(2) As high a wage as possible
(3) Employees' discounts
(4) Employees' commissions, bonuses, etc.
(5) Old age pensions
(6) Vacations with pay
(7) Mutual relief associations
(8) Social clubs and organizations with programs for recreation and improvement
(9) Library
(10) Smoking rooms in building
(11) Opportunities for advancement
(12) Decent hiring and firing system where employees are granted a hearing and their grievances respectfully considered.
(13) *Esprit de corps*—as important from the employer's viewpoint as from the employee's. To be happy in his work, the employee must take some pride in it, and if he does, it will necessarily rebound to the interest of the employer. Wage scales may be lower but employment preferred because good will and fairness prevail.
(14) A Training Department—to give the individual a proper understanding of his place in the organization; to let him know what is expected of him and what he may expect, and to help him realize both expectations; to give the employee personal advice and help and the necessary instruction which will prepare him for the job ahead.

III. To provide a means of making a profit
1. To buy low
a. Knowledge of markets
b. Knowledge of materials and construction
c. Knowledge of costs
2. To sell at a fair rate of profit
a. Knowledge of retail costs
b. Knowledge of required mark-up

TABLE 1—*Concluded*

3. To keep down operating costs
   a. Knowledge of clientele
      (1) Sales promotion
   b. Prevention of waste
      (1) Job requirements
      (2) Production records
   c. Promotion of efficiency
      (1) Labor turnover
      (2) Errors, complaints
      (3) Training on the job
   d. The movement of stock
      (1) Publicity methods
4. To promote good will
   a. Encouragement of fair practices in trading
      (1) Policies and salesmanship
   b. Avoidance of misrepresentation
      (1) Policies and salesmanship

TABLE 2

*Training aims based on analysis of aims of retailing*

1. To impart the principles involved in
   a. Consumer demand analysis
   b. Essential qualities of merchandise
   c. Style trends
   d. Economic conditions
   e. Traffic conditions
   f. Price concessions
   g. Perpetual inventories
   h. Budgets
   i. Balanced stocks
   j. Location and care of stock
   k. Market analysis
   l. Materials and construction
   m. Costs of manufacture
   n. Retail costs
   o. Required mark-up
   p. Sales promotion
   q. Job requirements
   r. Production records
   s. Labor turnover
   t. Errors, complaints
   u. Training on the job
   v. Publicity methods
   w. Policies
   x. Salesmanship
2. To impart general knowledge of all branches of the business to all workers and specific knowledge of a given department to the workers in that particular department.
3. To promote an *esprit de corps*.
4. To train for promotion.

fore, devoted to a hypothetical formulation of the aims of retailing and their analysis for training implications. On this basis certain aims for training were set up.

It may likewise be assumed that many store owners, executives, and personnel workers have definite ideas as to what training should accomplish in each store. Interviewing should provide a second list, which should represent the opinions of store people as to what the aims of training are or should be. The second part of the study contains the results of this survey and it is properly headed, *Practice.*

In Part III the aims of Parts I and II have been brought together for comparison. Part IV contains the conclusions which may be drawn from the study.

## I. AIMS OF TRAINING DERIVED FROM ANALYSIS OF HYPOTHETICAL AIMS OF RETAILING

As a result of the examination of authoritative works on economic distribution, the following three primary aims of *a retail store* were set up:

1. To act as a center of distribution.
2. To serve as a social community of workers.
3. To provide a means of making a profit.

The second aim may be subject for debate but the often expressed views of experienced merchants as well as economists is sufficient justification for its inclusion.

The three aims, as stated, were not specific enough and a second analysis was made of each of the three aims. This was followed by a third analysis of the resulting aims in the light of retail store practices. The resulting tertiary aims were then examined for training implications.

The results obtained by these analyses are recorded in table 1.

Table 1 should be read as follows: The *first* analysis of the aim, *to act as a center of distribution* yielded *two* secondary aims, *to gather goods from producers* and *to distribute goods to consumers.* The *second* analysis of the first secondary aim, *to gather goods from producers* yielded the aims, *to determine what to buy, where to buy, when to buy,* and *how much to buy.* The training implications in *what to buy* were *consumers' demand analysis, essential qualities of merchandise* and *style trends.* The rest of the table is read in the same way.

From the training implications in table 1 a list of specific training aims may be set up as in table 2.

## II. PRACTICE—A SURVEY OF THE OPINIONS OF STORE EXECUTIVES REGARDING AIMS OF TRAINING

To obtain data on training aims, actual or ideal, an interview outline was formulated and forty-six executives and workers from twelve stores in five cities were interviewed. The training aims obtained from these interviews arranged in rank according to frequency of mention are given in table 3.

The list of aims is given largely in the language of those interviewed. The interviewer refrained from any suggestions other than those necessary to keep the interview going.

TABLE 3

*Aims of training obtained from interviews with store executives and workers*

| ORDER OF FREQUENCY | AIMS | FREQUENCY |
|---|---|---|
| 1 | *To bring about better service to the public*<br>This means finding out where service is weak and improving it; impressing the salesperson with the fact that she must get the customer's point of view regardless of the amount of the sale; teaching her how to make the customer happy and satisfied; arousing in the salesperson a willingness for service and work. This will build up confidence on the part of the public. In order to meet competition successfully new and progressive ideas should be constantly placed before the salesperson. | 25 |
| 2 | *To promote efficiency in the individual worker*<br>This means impressing each worker with the virtue of doing his job thoroughly; eliminating mistakes and complaints; emphasizing accuracy; working for better sales; stimulating the workers to aid in the selection of merchandise; persuading the workers to understand the customer's point of view. | 21 |
| 3 | *To make store conditions happier*<br>This means helping each individual to broaden his outlook on life; inspiring the workers to ask questions and find out things for themselves; encouraging general culture by making the rank and file think; making the store atmosphere so attractive that people are happy and contented and like to work there; developing self-expressive activities for workers; and improving the morale of the employees by following up and encouraging the new workers. | 20 |
| 4 | *To fit workers for the job ahead* | 15 |
| 5 | *To make selling a profession*<br>This means showing the workers the opportunities in selling, giving them a respect for their jobs, and stimulating an interest in every job. | 12 |
| 6 | *To teach store policies and systems to workers* | 12 |
| 7 | *To increase the volume of sales* | 11 |
| 8 | *To teach salesmanship, approach, and merchandise knowledge* | 11 |
| 9 | *To foster store spirit, loyalty, and coöperation* | 10 |
| 10 | *To give non-selling workers instruction on the job* | 8 |
| 11 | *To teach courtesy to everybody in the store* | 8 |
| 12 | *To watch for promotion possibilities* | 7 |
| 13 | *To teach executives to teach and work with people* | 6 |
| 14 | *To make job-analyses of all non-selling jobs*<br>This means that training would get the right person in the right job. | 5 |
| 15 | *To give non-selling workers an idea of their importance in the selling process and an intelligent understanding of their part* | 2 |
| 16 | *To coördinate store activities and show interrelation* | 2 |
| 17 | *To teach mark-ups, mark-downs, profit and loss, turnover, etc. to buyers* | 1 |
| 18 | *To promote discipline* | 1 |

### III. A COMPARISON OF AIMS OBTAINED IN PARTS I AND II

An examination of the data obtained in Parts I and II showed an interesting relationship between the aims of retailing and the training aims obtained from the store people. This relationship is shown in table 4, in

TABLE 4

*A comparison of aims obtained in Parts I and II*

| | THEORY (AIMS OF RETAILING) | PRACTICE (AIMS OF TRAINING) |
|---|---|---|
| I | As a center of distribution | |
| | 2. To distribute goods to consumers | |
| | a. To render direct service in the form of direct attention to customers' needs | To bring about better service to the public |
| | | To teach courtesy throughout the store |
| | | To promote discipline |
| | b. To render indirect service in the form of store maintenance and conduct | To teach store policies and systems to workers |
| | | To teach executives how to teach others |
| | | To teach salesmanship, approach, and merchandise knowledge |
| II | As a social community of workers | |
| | 1. To provide broadly for the human needs of employees | To make store conditions happier |
| | b. To provide good mental and psychological working conditions | To give non-selling workers an idea of their own importance in the selling process |
| | | To fit workers for the job ahead |
| | | To give non-selling workers instruction on the job |
| | | To watch for promotion possibilities |
| III | As a means of making a profit | To increase the volume of sales |
| | 3. To keep down operating costs | |
| | b. To prevent waste | To coördinate store activities |
| | | To make job analyses of all non-selling jobs |
| | c. To promote efficiency | To teach mark-ups, turnover, etc. to buyer |
| | | To promote efficiency in the individual worker |
| | (1) To reduce turnover | To make selling a profession |
| | 4. To promote good will | To foster store spirit, loyalty and coöperation |

TABLE 5

*Aims of retail training*

1. To bring about better service to the public by
   a. Giving facts to workers
      (1) General, about the whole store
      (2) Specific, about their own jobs (Detailed data is contained in table 1)
   b. Promoting the right attitude toward the public and fellow workers through:
      (1) Courtesy
      (2) Discipline
      (3) Developing a professional attitude
      (4) Proper mental conditions, store spirit, loyalty and coöperation
2. To bring about more efficient operation by the same means enumerated under 1—a and b
3. To train executives to train
4. To develop workers for promotion

which the aims of training are placed opposite the aims of retailing to which they are related.

## IV. CONCLUSIONS

It is readily apparent that the most fruitful source of training aims is the analysis of store aims. Some stores have a carefully worked out statement of policies which may be analyzed for training material content. Where such a list does not exist, it should be prepared as it will also be useful for other purposes. The training aims as given by store executives are useful as a check on the analysis of store aims and may indicate points where executives feel that stress should be laid. Material from both sources may be combined by the Training Director to make a list of aims which is felt to be representative of the store.

The list in table 5 is a combination of the analysis of the aims of retailing and the list of aims supplied by store executives.

## V. SUMMARY

1. Training aims are of importance in providing definite goals for the Training Department.

2. These aims should be specific enough to indicate subject matter and groups to be reached.

3. There are two sources from which these aims may be obtained, an analysis of the aims of the store and the opinions of store executives.

4. The technique of such an analysis is described in this paper.

5. A combination of aims derived from both sources should provide a list of aims for the Training Department.

6. The list contained in this paper may be of use to stores in setting up their own aims and checking existing training programs.

7. The procedure herein described may be of value in other training situations in commerce and industry.

(*Manuscript received December 20, 1926.*)

# A Comparison of Ratings on Different Traits

By Arthur W. Kornhauser, *University of Chicago*

*The rating scale, even at its best, is far more subject to error and personal bias than are more objective modes of measurement. In the use of ratings, it is important that the various limitations be recognized and that efforts be made to improve the rating procedure and to provide a more adequate basis for the estimates. In the last of his series of four articles, Dr. Kornhauser points out certain suggestions for the improvement of ratings on the basis of an examination of the reliability with which different traits are rated, and the extent to which ratings on different traits duplicate one another.*

Two groups of students were rated by their instructors with a graphic rating scale for seven traits: Intelligence, Industry, Accuracy, Cooperativeness, Initiative, Moral Trustworthiness, and Leadership Ability. A comparison of distributions of ratings in the several traits reveals marked differences from trait to trait, which must be taken into account in interpreting individual ratings. Figures are also presented to show the relative standing of the traits with respect to the reliability of ratings in those traits and with respect to the factors which determine that reliability. The figures cover such variables as the following for each trait: excellence of spread of ratings, disagreement in average ratings by instructors, disagreement on individual students, correlations of ratings of pairs of instructors, etc. Everything considered, Intelligence and Industry appear to be the best judged of the seven traits, while Initiative, Coöperativeness, and Leadership Ability are the most poorly rated.

The traits are all found to be highly intercorrelated. (The coefficients of correlation range from 0.45 to 0.84.) The ratings also agree closely with average scholastic marks (coefficients of 0.58 to 0.83). These correlation figures suggest that most of the traits could be omitted without entailing much loss of information, concerning the general run of students. But even where the *general* agreement is very close between two traits, there are always a few individual students concerning whom the separate ratings tell far more than would any one of the estimates taken alone.

WITH respect to ratings on different traits we shall ask three questions: (*a*) How similar are the distributions as to average and as to scatter? (*b*) What evidence is there that ratings on some traits are better than those on other traits? (*c*) How close is the correla-

tion between traits—that is, how far is an individual's standing in one trait associated with his standing in other traits and how do the ratings compare with scholastic grades?

The answers to these questions are useful both in interpreting the ratings received by individuals and in estimating the value of the rating procedure. Suggestions for improvement may also arise in investigating these points.

The data dealt with in the present paper are ratings of college students by instructors. A graphic rating scale with seven qualities was employed.[1] The ratings are probably typical of those obtained by any ordinary system of rating where periodic estimates in fairly large numbers are secured. Two sets of ratings are analyzed: "Group A" is composed of graduating seniors rated by instructors who knew them fairly well; "Group B" is a general undergraduate group, some of whom were not so well known to the raters.

TABLE 1

*Averages and average deviations of the original ratings in Group A**

| | INTELLIGENCE | INDUSTRY | ACCURACY | COÖPERATIVENESS | INITIATIVE | MORAL TRUSTWORTHINESS | LEADERSHIP ABILITY | AVERAGE |
|---|---|---|---|---|---|---|---|---|
| Average | 6.9 | 7.2 | 6.4 | 7.4 | 6.5 | 8.0 | 6.7 | 7.0 |
| Average deviation | 1.33 | 1.58 | 1.39 | 1.60 | 1.36 | 1.41 | 1.37 | 1.43 |

* There are about 330 ratings for each trait except Moral Trustworthiness which has 214 ratings.

TABLE 2

*Averages and average deviations of the original ratings in Group B**

| | INTELLIGENCE | INDUSTRY | ACCURACY | COÖPERATIVENESS | INITIATIVE | MORAL TRUSTWORTHINESS | LEADERSHIP ABILITY | AVERAGE |
|---|---|---|---|---|---|---|---|---|
| Average | 6.5 | 6.7 | 6.1 | 6.9 | 6.2 | 7.5 | 6.1 | 6.6 |
| Average deviation | 1.26 | 1.33 | 1.20 | 1.14 | 1.23 | 1.31 | 1.19 | 1.24 |

* There are from 2845 to 3149 ratings for each trait.

## DISTRIBUTIONS OF THE RATINGS ON DIFFERENT TRAITS

Tables 1 and 2 provide a comparison of the distributions of ratings on the different traits. A few marked variations are present both in the averages and in the average deviations. These differences may be due to

[1] The scale and procedure were described in an earlier paper by the writer—*Reliability of Average Ratings*. Journal of Personnel Research, 1926, Vol. 5, 309–317.

peculiarities of the rating scale, to biases and unlike standards in the minds of the raters, or to special characteristics of the students rated. Barring the last, which seems improbable, the differences are of considerable significance in the practical use of the ratings, for they mean that

TABLE 3

*Comparison of figures* showing how well the several traits were rated—Group A*

| | CRITERIA | | | | | | | COMPOSITE RANK |
|---|---|---|---|---|---|---|---|---|
| | (1) Excellence of spread of ratings by instructors | (2) Disagreement in averages by instructors | (3) Disagreement in spread by instructors | (4) Excellence of differentiation among students | (5) Disagreement on individual students | (6) Correlation of sets of 3 instructors | (7) Correlation of 2 instructors | |
| Inteillgence | 1.28 (5.5) | 0.44 (2) | 0.25 (3) | 0.81 (6) | 0.83 (1) | 0.71 (4.5) | 0.44 (4) | 3 |
| Industry | 1.49 (1) | 0.56 (3.5) | 0.27 (5.5) | 1.40 (2) | 0.94 (4) | 0.82 (1) | 0.53 (1) | 1 |
| Accuracy | 1.32 (4) | 0.42 (1) | 0.27 (5.5) | 0.96 (4) | 0.96 (5.5) | 0.68 (6) | 0.42 (5) | 5 |
| Coöperativeness | 1.45 (2) | 0.77 (7) | 0.26 (4) | 1.39 (3) | 1.13 (7) | 0.77 (2) | 0.47 (2.5) | 4 |
| Initiative | 1.15 (7) | 0.56 (3.5) | 0.20 (1) | 0.63 (7) | 0.96 (5.5) | 0.38 (7) | 0.29 (6) | 7 |
| Moral Trustworthiness | 1.36 (3) | 0.67 (5.5) | 0.24 (2) | 1.42 (1) | 0.93 (3) | 0.75 (3) | 0.47 (2.5) | 2 |
| Leadership Ability | 1.28 (5.5) | 0.67 (5.5) | 0.29 (7) | 0.94 (5) | 0.85 (2) | 0.71 (4.5) | 0.26 (7) | 6 |

* These figures are of diverse nature. What each represents is indicated in the list following this paragraph. It is to be noted that in some of the columns excellence is shown by high numbers and in some by low numbers. The figures in parentheses in each column give the ranking of traits according to the criterion represented in that column.

Column 1. The numbers are averages of the average deviations of ratings given by individual instructors.

Column 2. The numbers are average deviations of the distributions of instructors' averages.

Column 3. The numbers are average deviations of the distributions of average deviations of instructors' ratings.

Column 4. The numbers are average deviations of the distributions of average ratings received by individual students.

Column 5. The numbers are averages of the average deviations or ratings received by individual students.

Column 6. The numbers are correlation coefficients showing the agreement between independent sets of three ratings received by students.

Column 7. The numbers are correlation coefficients showing the agreement between ratings by different instructors.

TABLE 4

*Comparison of figures* showing how well the several traits were rated—Group B*

| | CRITERIA | | | | | | | | COMPOSITE RANK |
|---|---|---|---|---|---|---|---|---|---|
| | (1) Excellence of spread of ratings by instructors | (2) Disagreement in averages by instructors | (3) Disagreement in spread by instructors | (4) Excellence of differentiation among students | (5) Disagreement on individual students | (6) Correlation of sets of 3 instructors | (7) Correlation of 2 instructors | (8) Correlation of 2 sets of ratings by instructors | |
| Intelligence | 1.18 (2) | 0.45 (1.5) | 0.17 (2) | 0.91 (1) | 0.97 (4) | 0.49 (2) | 0.41 (4) | 0.78 (1) | 1 |
| Industry | 1.20 (1) | 0.50 (4) | 0.19 (5.5) | 0.79 (2) | 1.01 (6) | 0.51 (1) | 0.44 (1) | 0.57 (4.5) | 2 |
| Accuracy | 1.12 (4) | 0.59 (5.5) | 0.18 (3.5) | 0.68 (6) | 0.92 (3) | 0.47 (3) | 0.42 (2.5) | 0.63 (3) | 3 |
| Coöperativeness | 1.05 (6) | 0.59 (5.5) | 0.15 (1) | 0.63 (7) | 0.90 (1) | 0.34 (6) | 0.32 (6) | 0.42 (7) | 6 |
| Initiative | 1.15 (3) | 0.49 (3) | 0.19 (5.5) | 0.76 (4.5) | 0.99 (5) | 0.42 (4.5) | 0.38 (5) | 0.57 (4.5) | 5 |
| Moral Trustworthiness | 1.02 (7) | 0.65 (7) | 0.18 (3.5) | 0.78 (3) | 1.08 (7) | 0.30 (7) | 0.42 (2.5) | 0.54 (6) | 7 |
| Leadership Ability | 1.11 (5) | 0.45 (1.5) | 0.20 (7) | 0.76 (4.5) | 0.91 (2) | 0.42 (4.5) | 0.31 (7) | 0.67 (2) | 4 |

* See note under table 3. The first seven columns here are parallel to those of table 3. Column 8 contains average correlation coefficients showing the agreement between ratings at different times by the same instructor.

a rating of a certain amount in one trait is not equivalent to a similar rating in another trait. For example, a rating of 9 in Leadership places an individual in the top 4 per cent of those rated, while he can have a 9 in Moral Trustworthiness and be only a little above average. In the actual use of ratings it is necessary to take into account the differences among the several traits as well as the differences in rating tendencies of different instructors.[2]

[2] Differences among instructors were dealt with in another article—*A Comparison of Raters*. Journal of Personnel Research, 1927, Vol. 5, 338–344.

### SOME INDICATIONS OF THE EXCELLENCE OF RATINGS ON DIFFERENT TRAITS

In tables 3 and 4 an attempt is made to show the relative standing of the traits with respect to the reliability of ratings in those traits and with respect to the factors which determine that reliability. For Group A, Industry comes out best, with Moral Trustworthiness and Intelligence next in order. In Group B, the order is Intelligence and Industry first, and Moral Trustworthiness last. There is comparatively little agreement between the ranking of traits in the two groups. The tables also make clear

TABLE 5

*Correlations between traits, using the average ratings of 68 students—Group A*

| | INTELLIGENCE | INDUSTRY | ACCURACY | COÖPERATIVENESS | INITIATIVE | MORAL TRUSTWORTHINESS | LEADERSHIP ABILITY | AVERAGE |
|---|---|---|---|---|---|---|---|---|
| Intelligence | — | 0.64 | 0.78 | 0.52 | 0.83 | 0.45 | 0.61 | 0.64 |
| Industry | 0.64 | — | 0.79 | 0.81 | 0.61 | 0.78 | 0.69 | 0.72 |
| Accuracy | 0.78 | 0.79 | — | 0.61 | 0.71 | 0.61 | 0.57 | 0.66 |
| Coöperativeness | 0.52 | 0.81 | 0.61 | — | 0.71 | 0.81 | 0.76 | 0.73 |
| Initiative | 0.83 | 0.61 | 0.71 | 0.71 | — | 0.57 | 0.75 | 0.70 |
| Moral Trustworthiness | 0.45 | 0.78 | 0.61 | 0.81 | 0.57 | — | 0.63 | 0.64 |
| Leadership Ability | 0.61 | 0.69 | 0.57 | 0.76 | 0.75 | 0.63 | — | 0.67 |

TABLE 6

*Correlations between traits, using the average ratings of 97 students—Group B*

| | INTELLIGENCE | INDUSTRY | ACCURACY | INITIATIVE | LEADERSHIP ABILITY | AVERAGE |
|---|---|---|---|---|---|---|
| Intelligence | — | 0.56 | 0.84 | 0.77 | 0.61 | 0.70 |
| Industry | 0.56 | — | 0.71 | 0.52 | 0.39 | 0.55 |
| Accuracy | 0.84 | 0.71 | — | 0.67 | 0.57 | 0.70 |
| Initiative | 0.77 | 0.52 | 0.67 | — | 0.67 | 0.66 |
| Leadership Ability | 0.61 | 0.39 | 0.57 | 0.67 | — | 0.54 |

the marked discrepancies in the standing of traits according to the different criteria and determinants of reliability. Everything considered, Intelligence and Industry appear to be the best judged of the seven traits, while Initiative, Coöperativeness, and Leadership Ability are most poorly rated.

Accuracy, for example, both correlate so closely with Intelligence that it seems likely we could omit them without great loss.

For a few pairs of traits, correlation coefficients were also computed using the ratings of individual instructors. The results are shown in table 7. As a

TABLE 7

*Correlations between traits, using the ratings of each of four instructors*

| INSTRUCTOR | NUMBER OF RATINGS | INTELLIGENCE AND INDUSTRY | INTELLIGENCE AND ACCURACY | INDUSTRY AND MORAL TRUSTWORTHINESS | ACCURACY AND MORAL TRUSTWORTHINESS | INITIATIVE AND LEADERSHIP | AVERAGE |
|---|---|---|---|---|---|---|---|
| A | 67 | 0.60 | 0.70 | 0.83 | 0.80 | 0.82 | 0.75 |
| H | 51 | 0.65 | 0.76 | 0.68 | 0.65 | 0.71 | 0.69 |
| S | 47 | 0.83 | 0.87 | 0.78 | 0.75 | 0.82 | 0.81 |
| EE | 52 | 0.69 | 0.78 | 0.82 | 0.76 | 0.78 | 0.77 |
| Average | | 0.69 | 0.78 | 0.78 | 0.74 | 0.78 | 0.75 |

TABLE 8

*Correlations between average grades and average ratings for a year—50 students in Group B*

| | CORRELATION WITH GRADES |
|---|---|
| Intelligence | 0.83 |
| Industry | 0.76 |
| Accuracy | 0.79 |
| Coöperativeness | 0.64 |
| Initiative | 0.72 |
| Moral Trustworthiness | 0.58 |
| Leadership Ability | 0.62 |
| Total rating in all traits | 0.81 |

## CORRELATIONS BETWEEN TRAITS

Tables 5 and 6 give the coefficients of correlation which show how closely the ratings in any two traits agree with each other. Where the correlations are particularly high, the question arises whether the ratings on the two traits are not practically duplicating each other. Initiative and

whole these correlations are closer even than those where average ratings were used. There is no apparent reason for viewing these correlations as other than typical, both of various instructors and of various trait combinations.

Closely related to the matter of the correlations of traits with one another is the question of their correlation

with scholastic grades. The average ratings of 50 students in each trait have been correlated with the average grades of these students for a year. The results are given in table 8.

A similar correlation study was made of the grades and ratings given by several individual instructors. The results are shown in table 9.

The correlations between grades and ratings are, in general, high. Where the coefficients are near 0.80, it is questionable whether the ratings are adding much. It remains true, however, that even where this very close general relationship is found, a number of individual cases stand out in which the ratings are markedly higher or lower than the grades would have suggested. For the sake of these exceptional cases, the ratings may be worth while even when the general agreement is close.

The higher correlation coefficients of table 8 as compared with those of table 9 suggest that individual instructors make distinctions between grade of scholastic work and character traits, but that these distinctions are not uniform from instructor to instructor, and hence tend to drop out or cancel one another when the student's ratings from a number of classes are combined.

It is difficult to draw any confident conclusions from all these correlation figures. Everything considered, however, the view seems justified that the interrelations of traits with one another and with scholastic grades are so close that most of the traits could be omitted without great loss. If, for example, the traits Intelligence, Industry, and Leadership Ability are used, all the other traits correlate about 0.80 with one or more of the three. But since Intelligence and Industry correlate almost as closely with grades, it might well be argued that even they are not worth having. In regard to all these high correlations the same point may be made—that even where the *general* agreement is very close between two traits, in some few individual cases the two ratings tell far more than either would alone. How far it is desirable to secure ratings on a number of closely related traits for the sake of the light thrown on occasional exceptional cases is a prac-

TABLE 9

*Correlations between grades in a course and ratings in the course for each of four instructors*

| INSTRUCTOR | NUMBER OF RATINGS | INTELLIGENCE | INDUSTRY | ACCURACY | COÖPERATIVENESS | INITIATIVE | MORAL TRUSTWORTHINESS | LEADERSHIP ABILITY |
|---|---|---|---|---|---|---|---|---|
| G | 30 | 0.73 | 0.46 | 0.53 | 0.61 | 0.72 | 0.19 | 0.58 |
| W | 30 | 0.73 | 0.58 | 0.78 | 0.46 | 0.44 | 0.29 | 0.17 |
| PO | 26 | 0.79 | 0.44 | 0.78 | —* | 0.46 | —* | 0.50 |
| DD | 30 | 0.66 | 0.57 | 0.59 | 0.57 | 0.62 | —* | 0.70 |
| Average..... | | 0.73 | 0.51 | 0.67 | 0.55 | 0.56 | 0.24 | 0.49 |

* Not rated or all rated the same.

tical question which must be settled in terms of the needs and costs in each special situation.

The analysis in this paper and in preceding discussions of the data[3] has intentionally dealt with ordinary routine ratings which, in all their crudeness and unreliability, are probably typical of the material ordinarily used in practice. That the estimates are not wholly worthless even on purely statistical grounds is apparent. Judged by non-statistical criteria they may be of very pronounced value.[4]

But ratings can be improved. It should prove possible greatly to reduce unreliability through changes in the rating procedure and through careful instruction to the raters. But the most important improvements depend upon instructors' gaining more accurate knowledge of their students—or, as a make-shift, on their rating only those students whom they do know well. After all, ratings *are* personal estimates. More satisfactory rating results are likely to come with more satisfactory personal relations—with a more individualized and deformalized educational process. Perhaps the thought can be extended to industry as well.

(*Manuscript received June 5, 1926.*)

[3] In the two papers referred to in the two preceding footnotes.

[4] See *What Are Rating Scales Good for?* Journal of Personnel Research, 1926, Vol. 5, 189–193.

# Morphologic Types and Mental Ability

By Wm. H. Sheldon, *University of Chicago*

*Are people with relatively small bodies more intelligent than those with large bodies? This was once thought to be indicated with a correlation of 0.36, but now Dr. Sheldon in a study covering 450 cases, finds the relationship to be so low that it is certainly of very doubtful significance. Scientists have rarely found an association of a bodily characteristic with a mental ability.*

In 1921 the late Dr. Naccarati made a comparison of intelligence with morphological type. He differentiated three morphological types, the macrosplanchnics, whose trunks are relatively large compared with the length of their limbs, the microsplanchnics, in whom the opposite condition prevails, and the normosplanchnics. This morphological characteristic was put into the form of an index from a series of bodily measurements, and with 75 Columbia University students as subjects, correlated 0.36 with the Thorndike Entrance Examination, the microsplanchnics scoring the highest in the examination.

Dr. Sheldon duplicated Naccarati's investigation, using as subjects a group of 450 students entering the University of Chicago in 1924. The morphological index correlated 0.136 with standing in the Psychological Examination published by the American Council on Education, and 0.114 with grades for the fall quarter of 1924.

While making the physical measurements the examiner estimated the student's intelligence. The estimate correlated 0.206 with grades, proving to be more valuable than the morphological index as a predictor of scholarship.

IN 1921 the late Dr. Naccarati,[1] following the lead of a group of Italian anthropologists, introduced the classification of morphological types, as a possible step toward determining some physical characteristics of the so-called "intelligent type." He differentiated three general types of physique, according to the volume of the trunk in relation to the length of the limbs. These were called the macrosplanchnic, microsplanchnic, and normosplanchnic types. Macrosplanchnics are individuals whose trunks are relatively large compared with the length of their limbs. In microsplanchnics the opposite condition prevails, while in normosplanchnics the trunk-limbs proportion deviates relatively little from the norm for the particular ethnic group concerned.

To put this morphological characteristic in a numerical form, Naccarati, following the anthropologist

[1] Naccarati, Sante. *The Morphological Aspect of Intelligence.* Archives of Psychology, No. 45, 1921.

Viola, took eight trunk measurements and the length of one arm and one leg. The eight trunk measurements are as follows: sternum length, anterior-posterior thoracic diameter, transverse thoracic diameter, xipho-epigastric line, transverse epigastric diameter, anterior-posterior epigastric diameter, pubo-epigastric line, and transverse pubic diameter.

by the trunk value, and carried to five places, gives as a quotient the morphological index which Naccarati used. A sample case, illustrating this calculation, is given in figure 1.

Naccarati found a positive correlation of 0.36 between morphological index and intelligence test scores at Columbia University, using the Thorndike Entrance Examination as the

Name.....
No.....

| | |
|---|---|
| 1. Sternum length | 15.5 |
| 2. Xipho-epigastric | 11.8 |
| 3. Pubo-epigastric | 27.4 |
| 4. Transverse thoracic diameter | 23.5 |
| 5. Anterior-posterior thoracic diameter | 15.8 |
| 6. Transverse epigastric diameter | 24.7 |
| 7. Anterior-posterior epigastric diameter | 16.9 |
| 8. Transverse pubic diameter | 26.4 |
| 9. Length of lower extremity | 81.9 |
| 10. Length of upper extremity | 57.9 |
| 11. Height | xxxx |
| 12. Weight | xxxx |

| | | | |
|---|---|---|---|
| a. | $1 \times 4 \times 5$ | 5755.150 | (thoracic index) |
| b. | $2 \times 6 \times 7$ | 4925.674 | (index of upper abdomen) |
| c. | $3 \times 7 \times 8$ | 12224.784 | (index of lower abdomen) |
| d. | sum of a, b, and c | 22905.7 | (trunk-value) |
| e. | sum of 9 and 10 | 139.8 | (limbs-value) |
| f. | $e \div d$ | .006103 | (morphological index) |

The point is moved five places to the right, for convenience. Thus:
Morphological Index = 610.3

FIG. 1.

By multiplying these measurements together in groups of three (the anterior-posterior epigastric diameter being used twice), he obtained three sub-products which he added and called the *trunk-value*. The length of an arm was then added to the length of a leg and the result was called the *limbs-value*. This limbs-value, divided

criterion of mental ability. This he thinks points to the probability that there exists a general relationship between morphologic type and mental ability, the microsplanchnics tending to excel the macrosplanchnics in mentality. But Naccarati's subjects in this experiment numbered only 75. They were men students at Columbia,

apparently undergraduates, whose ages at the time ranged from 17 to 22 years.

In order to test this lead further, we duplicated Naccarati's technique at the University of Chicago in the fall of 1924, and measured 450 men of the entering class, all of them belonging to the white race, and between the ages 17 and 22. Care was taken to follow Naccarati's procedure minutely, and as a check on the accuracy of the measurements, 24 men were re-measured after an interval of several days. The correlation between the two sets of morphological indexes thus calculated for these 24 men was 0.96.

Two criteria of mental ability were used in the work at Chicago. These were (1) scores on the Psychological Examination published by the American Council on Education and prepared by Dr. Thurstone (1924 edition), and (2) scholarship grades for the fall quarter, 1924. The psychological test consists of nine separate tests each of which is scored individually. The item used in computing correlations was the student's median decile rank; that is, a student's decile standing on each of the nine parts of the test was found, and the median of these was the item used. The scholarship criterion was the average number of grade points per course taken. In 1924 the University of Chicago was using a grade point system, in which an *A* equals six grade points, an *A*− five grade points, etc.

At the time of taking these men's physical measurements, I made and recorded a subjective estimate of each man's general intelligence. This estimate was based on the man's general appearance, his behavior while being measured, and whatever conversation took place during the ten minutes or so involved. The estimates were recorded in the form of ratings on the basis of ten. They appear in table 1 under the heading EEGI (examiner's estimate of general intelligence).

In studying the possible relations between morphological index and mental abilities, each of the separate measurements entering into the index was correlated with the two mental criteria, and decile rank on each of the nine parts of the psychological test was correlated with morphological index. These correlations are shown in table 1.

The correlation between morphological index and psychological test scores is 0.136; that between morphological index and grades, 0.114. The correlation between morphological index and the separate parts of the psychological test is in every case lower than that between morphological index and the test as a whole. Similarly the correlation between grades and the separate measurements composing the index, and that between psychological test scores and the separate measurements, is in every single case lower than that between these respective intelligence criteria and the index itself. This demonstrates that whatever relationship *does* exist between morphological index and intelligence certainly is not a resultant of a relatively high relationship between intelligence and some one or two of the specific measurements composing the index.

Both the psychological test scores and scholarship grades seem to bear a slight positive relation to length of

limbs, and a very slight negative relation to the splanchnic measurements. These correlations are very low, but consistent.

Likewise the correlations between morphological index and the separate parts of the psychological test are rather consistently positive, and very low. There is only one negative coefficient in this group, but only two are higher than 0.10.

The possibility of curvilinear regression was considered in connection with this study. For each of the correlations a scatter diagram was plotted, and these were inspected by the writer and by Dr. A. W. Kornhauser for signs of non-linearity. There seemed to be little trace of this in the distributions, but for a more accurate check, several of the eta coefficients were calculated. The differences between these eta coefficients and the product-moment coeffi-

TABLE 1

*Correlations—Morphologic measurements and intelligence criteria*

A. Physical measurements and mental criteria ($N$ = 434)

| | GRADES | PSYCHOLOGICAL TEST |
|---|---|---|
| Morphologic index | 0.114 | 0.136 |
| Length of lower extremity | 0.083 | 0.095 |
| Length of upper extremity | 0.002 | 0.005 |
| Sternum length | −0.001 | −0.009 |
| Xipho-epigastric | 0.005 | 0.046 |
| Pubo-epigastric | 0.032 | 0.035 |
| Transverse thoracic diameter | −0.121 | −0.067 |
| Anterior-posterior thoracic diameter | −0.151 | −0.076 |
| Transverse epigastric diameter | −0.091 | −0.067 |
| Anterior-posterior epigastric diameter | −0.118 | −0.102 |
| Transverse pelvic diameter | −0.114 | −0.040 |
| EEGI | 0.206 | |

B. Psychological test results and physical measurements

| | MORPHOLOGICAL INDEX |
|---|---|
| Proverbs test | 0.051 |
| Opposites test | 0.069 |
| Completion test | 0.074 |
| Grammar test | 0.123 |
| Artificial language test | 0.121 |
| Reasoning test | 0.030 |
| Arithmetic test | −0.023 |
| Estimating test | 0.031 |
| Reading test | 0.066 |

The probable error is approximately 0.03 for all of the correlations in this table.

cients were uniformly much too slight to signify curvilinear regression by the Blakeman test.

These results in part support Naccarati's work. Yet, because of the much lower correlations and larger number of cases, they rather contradict than support his generalization. There appears to be a slight positive relationship between morphological index and intelligence, as we habitually measure the latter. But there certainly is not a very high degree of such a relation in an undifferentiated group of white university students. It is possible that this relation exists to a greater extent in some racial stocks than in others. I excluded Negroes and Orientals from my group, but made no further attempt at differentiation. Hebrews constituted about 20 per cent of the group. I doubt, however, that this factor greatly influenced the result. Naccarati's group was a mixed one, and Sommerville,[2] in his recent work on physical, motor, and sensory traits, controlled this factor by eliminating Hebrews in some of his correlations; this made no considerable difference in his results. The age factor was the same in both investigations.

Naccarati used a three-hour test (the Thorndike Test). Wood[3] and others have reported somewhat higher correlations between the Thorndike test and scholarship grades than have been found in the case of the National Research Council test which I used. The correlation between this test and grades, for 304 of my subjects, was 0.40. Assuming the possibility of even a considerably higher correlation between scholarship and the test used by Naccarati, this would have no bearing on the present question, because of the fact that here the correlation between grades and morphological index was even lower than that between the latter and the test results.

[2] Sommerville, R. C. *Physical, Motor, and Sensory Traits.* Archives of Psychology, No. 75, 1924.

[3] Wood, B. D. *Measurement in Higher Education.* New York, 1923.

### CONCLUSIONS

The following conclusions represent a summary of the facts presented in this first section of the study under consideration:

1. Naccarati's morphological index does show some relation to intelligence, although the relation found in this investigation is somewhat lower than that reported by him.

2. This correlation between morphological index and intelligence is not due to any distinctly high relation between some one or more of the measurements composing the index, and intelligence. Likewise it is not due to a high relation between the index and any separate part of the psychological test used, nor to a high relation between separate physical measurements and separate parts of the test.

3. About the same degree of relationship seems to exist between the morphological index and scholarship, as exists between the former and psychological test scores.

4. The value of the morphological index as a prediction of scholarship is somewhat less than that of a single subjective estimate of intelligence, based on a ten-minute acquaintanceship.

(*Manuscript received October 19, 1926.*)

# Selective Placement of Metal Workers

## III. Selection of Toolmaking Apprentices

By Millicent Pond, *Scovill Manufacturing Company*

*An encouraging feature of this study is the enthusiasm with which the foremen in the apprentice training room have taken to the employment tests. They have noted for themselves how their burdens have grown lighter through the elimination of the unsuited apprentices who formerly made the heaviest demands on their time and patience. They have seen how this was accomplished without diminishing the supply of satisfactory applicants, and without turning away from the factory those who are unsuited for the apprenticeship.*

This special study of toolmaking apprentices was part of the general investigation of intelligence tests for employment in the Scovill Manufacturing Company.

Eight tests and a personal history questionnaire were given to three separate groups of apprentices. As a criterion of the success of these boys the author used ratings by foremen expressed in four degrees,—*excellent, good, poor,* and *very poor.* Those rated as excellent or good were considered *satisfactory,* while those rated poor or very poor were considered *unsatisfactory.*

Each test was evaluated by determining if preferred ranges of test scores could be set off, in which the per cent of satisfactory workers was significantly higher than in the group as a whole. This could be done for scores in five non-verbal tests, errors in one of them, and age. A total score was obtained for these significant measures, and preferred ranges were again worked out. The per cent of satisfactory workers in the preferred range for total scores was 82, in the non-preferred range 23, while among all the apprentices tested it was 60.

Rigorous use of this selective device for a year has reduced the number of unteachable apprentices among those hired from 18 per cent to zero.

THE apprentice training course in toolmaking at the Scovill Manufacturing Company gives systematic instruction in all phases of toolmaking which are found in this particular factory, and which can be brought into the compass of a four year course. The work of the apprentices is entirely practical. Except for two hours per week spent in classroom exercises in mathematics, and two in other subjects, the whole time

is given to real projects, i.e., to the manufacture of tools for actual use in other departments. The problems are carefully distributed to the apprentices according to their difficulty, and because the hiring has been very regular over a period of years it has been possible in general to avoid pushing an apprentice along too fast, or holding him too long on the same grade of work. Both in the class-room and the shop, instruction is individual, one instructor being responsible for the work of seven or eight boys only. Through the particular cost accounting system in use, the work of the apprentices is brought into competition with that of adult and experienced toolmakers in other departments, and each instructor must know at all times, in terms of standard tolerances and time, the quality and quantity of work of a given kind of which each of his pupils is capable.

Incentives for the apprentices are consistent throughout the four years. They are paid day rates with periodic increases. If their work is not satisfactory, after due warning and ample instruction they are dropped from the course. At the end of four years of satisfactory performance, a certificate is awarded, and the graduate apprentice is placed with the company as journeyman toolmaker. Moreover, this certificate is accepted by other firms, and although it is expected that the majority of graduates will wish to continue their connections with the company, no one is held against his will.

In judging the work of an apprentice to be satisfactory or unsatisfactory, shop performance is emphasized above the ability to apply the principles of mathematics to the planning of work. Indeed, although the latter is by no means considered unnecessary, manipulative accuracy and speed are at such a premium that in extreme cases where these are notably present, an apprentice may be rated satisfactory even though it is clear that the planning of new work by him will always have to be supervised. When this occurs, to prevent misunderstandings the certificate is not awarded and the apprentice is told of this possibility at an early stage, but he is carefully instructed and finally placed in such regular toolmaking as will utilize his skill with a minimum requirement in mathematics.

This course offered excellent material for intensive employment test research. The opportunities for evaluating ability in the apprentices made the foremen's ratings satisfactory as criteria of success. The regular hiring and systematic planning of the course of instruction gave relatively large groups of subjects who were homogeneous as to occupation, in spite of the variety of work learned. In addition to these inherent conditions, the hearty coöperation and many constructive suggestions of the director of the course, Mr. W. S. Berry, materially furthered the study. Mr. Berry was familiar with test validation procedure, and had experimented with earlier groups of apprentices; he spared no pains in giving information desired at any time. Moreover, his cooperative attitude was reflected by the foremen under him, who were in sympathy with the investigation and always ready to make their contribution with great care.

### THE GROUPS STUDIED

Three consecutive groups of apprentices were involved in this study: those on the roll December 1, 1923, when testing was begun; those hired or transferred to apprentice training from December 1, 1923, to September 1, 1925; and those hired or transferred in from September 1, 1925, to September 1, 1926. The first group, tested together on December 3, 1923, numbered 35. They represent the residue at that date of all who had been hired since January 1, 1920, of whom there had been 57. Records of age and schooling were available for all of these employees, but test records were not available for the 22 who had terminated. The second group numbered 50, the third, 55. For both of these groups the records were complete.

The last two groups, because they represent consecutive hiring, are comparable with the original group of 57. In order to make certain comparisons with the residual group of 35, subsamples of the second and third samples were set off, i.e., residues at a given date, as shown in the table below. They are only roughly comparable, of course, because the number of months covered by the hiring and the relation of the residue date to that period, are not the same in each case.

*List of samples*

| GROUP | ENTERED APPRENTICESHIP | NUMBER |
|---|---|---|
| I | January 1, 1920, to December 1, 1923* | 57 |
| II | December 1, 1923, to September 1, 1925 | 50 |
| III | September 1, 1925, to September 1, 1926 | 55 |

* Actually, to July 30, 1923. From that date to December 1, 1923, no apprentices were hired.

| GROUP | MEMBERS OF | ON ROLL | NUMBER |
|---|---|---|---|
| $I_a$ | Group I | December 1, 1923 | 35 |
| $II_a$ | Group II | December 1, 1925 | 26 |
| $III_a$ | Group III | December 1, 1926 | 33 |

On account of the lack of records in Group I, Groups II and III are given greater emphasis in this study.

Apprentices of Groups I and II and those of Group III who were hired before January 1, 1926, were interviewed as applicants both by the employment office interviewer and by the director of training, and chosen with regard to certain standards of age, schooling, physical fitness (based upon examination), and personality, in so far as the latter could be inferred from conversation and recommendations. As a rule the accepted applicant was signed up to report at a date some weeks after the interview, since there was always a waiting list. In some cases, however, the applicant was hired immediately for other work with the company, and later transferred to the apprentice course. From January 1, 1926, following the development of a tentative placement scale based upon the records of Group II, no applicants except those recommended by the test were hired, and the selection from among these was made by the employment office interviewer. The director of training ceased to interview.

Most of the apprentices were

American born and had their schooling in this country, but many were of foreign parentage. Their ages ranged from 16 to 26½ years at the date of hiring, with the interquartile range from 17 to 19.2 years. Schooling ranged from 5 to 16 years completed, with the interquartile range from 7.9 to 10.4 years.

### EMPLOYMENT MEASURES

The measures studied were the scores in Tests 1 to 8, which were given exactly as described in the first article of this series, as well as errors in Tests 1, 2, 4, and 5, age, schooling, transfer, and place of birth of father. Age and schooling, as before, were accepted as reported by the applicant. Transfer records, which distinguished apprentices who had been transferred into the course from those who were hired without previous experience with the company, were studied with the thought that the former might show a higher percentage of satisfactory workers than the latter, due to the greater opportunity for preliminary observation and selection. The father's place of birth was secured as accurately as possible from the instructors, but only for Groups I and II, and not at the beginning of the experiment. It could not be very accurate under the circumstances.

Only one minor check on the reliability of the tests was made, because of the extensive investigation in the Army. Forty-one apprentices were given the test series twice at an interval of one week; the reliability of the final employment score was $+0.90 \pm 0.02$.

### CRITERION OF SUCCESS

As already indicated, the criterion of success used in this study was a series of ratings made by the foremen, based upon the constant individual supervision of the apprentices by the instructors, and of instructors and apprentices by the foremen, which took into account both quality and quantity of performance. The ratings were on one descriptive quality only, called general ability in apprentice work. They were of four degrees, namely, *excellent*, *good*, *poor*, and *very poor*. They were not made on a graphic scale. For certain purposes the excellent and good workers were grouped as *satisfactory*, the poor and very poor, as *unsatisfactory*.

The decision to use so simple a plan for rating was the outcome of experience with the same raters and the same subjects. When an attempt was made to rate apprentices on four qualities—ability to learn new work, manipulative skill, speed of work, persistence—the halo effect was quite high, intercorrelations of abilities averaging $+0.78 \pm 0.05$ for one foreman, and $+0.83 \pm 0.04$ for another. The scatter of ratings on a graphic scale usually covered no more than five steps, and these, if the ratings were not all made at one time, did not agree closely with subsequent action of the foremen in dropping or retaining the boys in the course. Judgments, not on various qualities but simply on a basis of satisfactory or unsatisfactory work, substantiated by records of performance, and resulting finally in termination of the unsatisfactory apprentices, were con-

stantly being made as a matter of shop management. Consequently it was not difficult for the foreman to make similar judgments for the whole group at any given date, and to set off from the unsatisfactory apprentices those whose work was very poor indeed, and from the satisfactory, those who were excellent. He was never asked to do this for boys, still active, who had been in the course less than two months. For those who had been dropped or who had terminated voluntarily before the rating date he depended upon his memory of current judgments.

Two ratings were used for this study. In November, 1925, the director of training, foreman, and assistant foreman of the training room together rated all members of Groups I and II, and in November, 1926, the same assistant foreman, who in the meantime had succeeded the foreman in position, rated the members of Group III. This third rater, although new in his position, had built up particularly close contacts with the instructors under him and with the work of the boys themselves before these ratings were made.

Terminations among the apprentices are closely related to "unsatisfactory" ratings, but the correspondence is not absolute since some termination occurs among satisfactory workers. It may be expected, therefore, that placement scales based upon foremen's ratings will be somewhat less valid for the prediction of stability than for general ability in apprentice work.

### CHANGES IN MANAGEMENT

Changes in management personnel or policy during the course of an experiment are sources of error the importance of which is difficult to estimate. Reference has already been made to certain changes which occurred in the management of the apprentice room during the observation period, and these should be described. Although they were carried out gradually, they may have affected the situation.

Little by little throughout 1925 and the early part of 1926, the duties of the foreman, which included investigation of all projects previous to their assignment to individual apprentices, supervision of the instruction, and even gauging and inspection of all finished work prior to delivery, had become too heavy for one person. There had been a continuous increase in the number of apprentices in the course, and in the types of work submitted to the training room. The situation became acute, and inevitably there resulted a relaxation of control. With the appointment of assistant foremen from the rank of the instructors, whose duty it was, under supervision, to relieve the foreman of all preliminary investigation, and with the adoption of the policy of holding the instructors responsible for the quality of work turned out by their own pupils, the foreman was able to give much more attention than before to the supervision of instruction and production. The standards of performance were once more rigorously enforced.

This change did not go forward without a change in personnel. There were new instructors to take the place of those who were promoted and who terminated, and to meet the demands

of the increased number of apprentices. There were new assistant foremen, and a new foreman. For the most part, the changes were not abrupt. The new foreman, with a vocational history running the whole gamut of positions in the shop, from apprentice to assistant foreman, was thoroughly familiar with all policies and conditions. Two of the assistant foremen had been instructors. The director of apprentice training supervised the changes and was in touch with all situations.

It is impossible to estimate the relative influence of these factors—change in personnel and in supervisory standards on the one hand, continuity of tradition and of ultimate responsibility on the other. If numerical relationships in the test investigation are alike for two periods of apparently different management, it may be argued that these relationships have sufficient permanency to withstand the influence of such changes. On the other hand, any attempt to determine the practical value of an application of research results during such a period will be conditioned seriously by the fact that improvement in the general quality of workmanship may be ascribed either to the change in control or to the application of experimental results, and that lack of improvement may mean simply a cancellation of effect. Thus a more rigorous criticism of apprentices, resulting in a lowered average rating, might hide an actual rise in the average ability, due to a selection of subjects rated. Lacking objective measures of individual accomplishment in the present case, these issues will remain in question.

## RESULTS AND CONCLUSIONS

*Individual measures.* If the 105 apprentices of Groups II and III are distributed according to their scores in Test 4, and the percentage of satisfactory workers is then calculated for each 5-point interval, we have the results given in table 1.

This distribution will repay analysis. In the first place, it is interesting to note the wide range of scores represented by the group. Test 4 does not start as low in score as do Tests 1, 2, and 3, and the fact that none of the apprentices failed to score in it shows that very low scored individuals are not present in the sample. This is what one expects, since all of the apprentices were literate and English speaking, and all but two had completed 7th grade schooling. On the other hand, although the total possible range for this test is from 100 to 210, the scores actually found extend from 105 to 199, and the distribution is fairly normal. Apparently the method of choosing apprentices by interview actually practiced in the past, did not limit the range of mental ability nearly as much as might have been expected.

The association of high percentages of satisfactory employees with high test scores, and vice versa, is another matter of interest in table 1. In spite of fluctuations, a definite trend can be recognized. This is still more clearly shown when we group the data, mark off critical sections where the increase in percentage appears to be abrupt, and note the progression, 29, 56, 82 per cent of satisfactory workers in the three successive sections of the scale.

Any critical section or series of sections in which the percentage of satisfactory workers is greater than for the sample as a whole, is known in this study as a preferred range. In Test 4, scores from 165 up, involving 33 apprentices of whom 82 per cent were rated satisfactory, constitute the preferred range. These figures are sufficiently large to meet the requirement for theoretical reliability of a difference, namely that the difference should be at least three times its standard error ($D/\epsilon = 3.1$).

In the lower part of table 1 a distribution is given of all scores in Test 4 compared with ratings.

The material given in table 1 is typical of all but one of the eight tests of the series, and of two other measures, namely age, and errors in Test 2. No critical sections are found in Test 6, schooling (within the limits of the sample), or errors in any of the tests other than Test 2. Nativity of the father showed no significance in Group II alone, and was not studied further. Contrary to expectations, the 20 apprentices who were transferred to the training room from other occupations with the company fail to show a higher percentage of satisfactory ratings than apprentices who were hired from outside, in spite of the opportunity for selection through observation and recommendation as well as interview. (Whole group 60 per cent satisfactory; transferred, 65 per cent satisfactory. $D/\epsilon = 0.5$.)

Table 2 gives the critical sections with numbers and percentages for Tests 1 to 5, 7, 8, errors in Test 2, and age, also their measures of reliability. Scores have been omitted from the table for the sake of simplicity, but it should be borne in mind that the scores separating two critical sections do not come at the same places in different tests. Since the original class intervals are not

TABLE 1

*Distribution of Groups II and III according to foremen's ratings and scores in Test 4**

| | SCORES IN TEST 4 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 105 | 110 | 115 | 125 | 130 | 135 | 145 | 150 | 155 | 165 | 170 | 175 | 180 | 190 | 195 | Total |
| Number hired | 1 | 2 | 3 | 4 | 7 | 18 | 11 | 13 | 13 | 10 | 14 | 6 | 1 | 1 | 1 | *105* |
| Per cent satisfactory | 0 | 0 | 33 | 50 | 29 | 61 | 36 | 54 | 69 | 80 | 79 | 83 | 100 | 100 | 100 | *60* |
| Critical sections, per cent satisfactory | 29 | | | | | 56 | | | | 82 | | | | | | *60* |
| Number rated | | | | | | | | | | | | | | | | |
| Excellent | | | | | | 2 | 1 | | 1 | 2 | 3 | 1 | 1 | | | *11* |
| Good | | | 1 | 2 | 2 | 9 | 3 | 7 | 8 | 6 | 8 | 4 | | 1 | 1 | *52* |
| Poor | 1 | | 1 | 2 | 3 | 5 | 6 | 6 | 4 | 2 | 3 | 1 | | | | *34* |
| Very poor | | 2 | 1 | | 2 | 2 | 1 | | | | | | | | | *8* |

**Note:* Due to the manner of calculating these scores, no cases fall in the intervals 120 to 124, 140 to 144, 160 to 164, 185 to 189. For purposes of correlation the diagram is not condensed, but shows these empty columns.

shown, the amount of fluctuation of the percentages is not indicated, and one cannot tell the character of distributions of persons hired. For all tests the range is wide, and the distributions nearly normal. Errors in Test 2 and age are severely skewed. It is interesting to note from the table that the preferred range for Test 8 is in the middle of the scale rather than at either end—certainly not a straight line relationship. Test 5 gives evidence also of a curved line trend.

All but two of the measures in this series are reliable, if we accept the approximation $D/\epsilon = 2.9$; four of these, namely Tests 2 and 4, errors in Test 2, and age show an increase of 10 per cent or more in the satisfactory workers of the preferred range over the 60 per cent satisfactory sample.

*Combined scale.* The individual measures were combined according to the method described in the preceding article of this series. In the record of each apprentice the critical section percentages were used instead of the corresponding test scores, and added for the various single measures which were to be combined. Trial combinations were made and the resulting scores distributed and percentages calculated. The best of these from the standpoint of validity and reliability of the preferred and non-preferred ranges, and minimal fluctuation in the percentages from class interval to class interval, was accepted as the final combination.

The combination thus secured includes Tests 1, 2, 3, 4, 8 errors in Test 2, and age. Tests 5 and 7 were rejected solely on the trial basis, be-

TABLE 2

*Distribution of Groups II and III in Tests 1 to 5, 7, 8, errors in Test 2, and age*

| | NUMBER OF APPRENTICES | | | | PER CENT SATISFACTORY | | | | $D/\epsilon$* |
|---|---|---|---|---|---|---|---|---|---|
| | Sections | | | | Sections | | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | |
| Test 1 | 11 | 69 | 25 | | 18 | 62 | 72 | | 2.9 |
| Test 2 | 22 | 17 | 36 | 30 | 36 | 47 | 67 | 77 | 3.0 |
| Test 3 | 6 | 21 | 78 | | 17 | 43 | 68 | | 2.9 |
| Test 4 | 17 | 55 | 33 | | 29 | 56 | 82 | | 3.1 |
| Test 5 | 10 | 21 | 31 | 43 | 20 | 52 | 77 | 60 | 2.6 |
| Test 7 | 17 | 32 | 30 | 26 | 29 | 59 | 67 | 73 | 2.2 |
| Test 8 | 12 | 77 | 16 | | 33 | 69 | 38 | | 3.1 |
| Errors in test 2 | 66 | 28 | 11 | | 71 | 46 | 27 | | 3.0 |
| Age | 70 | 35 | | | 50 | 80 | | | 2.9 |

*Tests:* 1. Pictorial completion. 2. Number checking. 3. Digit-symbol substitution. 4. Geometrical construction. 5. Arithmetical reasoning. 6. Synonym-antonym. 7. Analogies. 8. Circle marking.

* $D$ is the difference between the per cent of satisfactory workers in the preferred range and the per cent of satisfactory workers in the group as a whole (60 per cent). For this difference to be significant it should be at least three times as great as its standard error, i.e., $D/\epsilon$ should be 3 or more.

cause they did not contribute to the combination of Tests 1 to 4 already made. With Test 6, which gave no critical sections, Tests 5 and 7 are the only verbal tests of the series, and their smaller validity is therefore interesting. Under these conditions, at least, the non-verbal tests are more significant.

The new scale of scores ranged from 246 to 519, with critical score at 417 dividing the preferred from the non-preferred range. The preferred range includes 66 of the 105 individuals, twice as many as in the best of the single scales. Of these, 82 per cent were satisfactory, which contrasts strongly with 60 per cent satisfactory in the group as a whole, and 23 per cent in the non-preferred range. The theoretical reliability of the scale is high: $D/\epsilon = 5.9$ in the preferred range, 6.0 in the non-preferred. In application, if the critical score at 417 is used as a passing mark, and the selection of apprentices by the interviewer is made from among the applicants who pass, there is a high probability that the majority of applicants hired will do satisfactory work, and that the majority of those rejected or placed elsewhere according to test results would do poor or very poor tool-making.

Table 3 gives a distribution of the 105 apprentices on the combined scale, together with the percentages of satisfactory and unsatisfactory workers in the preferred and non-preferred ranges, and the percentages of all grades of workers found in each critical section.

TABLE 3

*Distribution of Groups II and III in the combined scale, Tests 1, 2, 3, 4, 8, errors in Test 2, and age*

| | COMBINED SCORES | | | | | WHOLE GROUP |
|---|---|---|---|---|---|---|
| | 246 to 342 | 343 to 416 | 417 to 441 | 442 to 483 | 484 to 519 | |
| Number of apprentices | 12 | 27 | 25 | 32 | 9 | *105* |
| Per cent satisfactory | 8 | 30 | 68 | 88 | 100 | *60* |
| Critical section, per cent satisfactory | 23 | | 82 | | | *60* |
| Per cent excellent | | | 8 | 22 | 22 | *10* |
| Per cent good | 8 | 30 | 60 | 66 | 78 | *50* |
| Per cent poor | 50 | 59 | 28 | 12 | | *31* |
| Per cent very poor | 42 | 11 | 4 | | | *9* |

Figure 1 presents the same material in graphical form, in symbols representing actual cases rather than percentages. The heavy horizontal line separates the satisfactory workers from the unsatisfactory; the heavy vertical line, CC, separates the test-preferred employees from the non-preferred.

A combined scale, constructed on the basis of foremen's ratings, and predictive of quality of workmanship, cannot be expected to show relationship

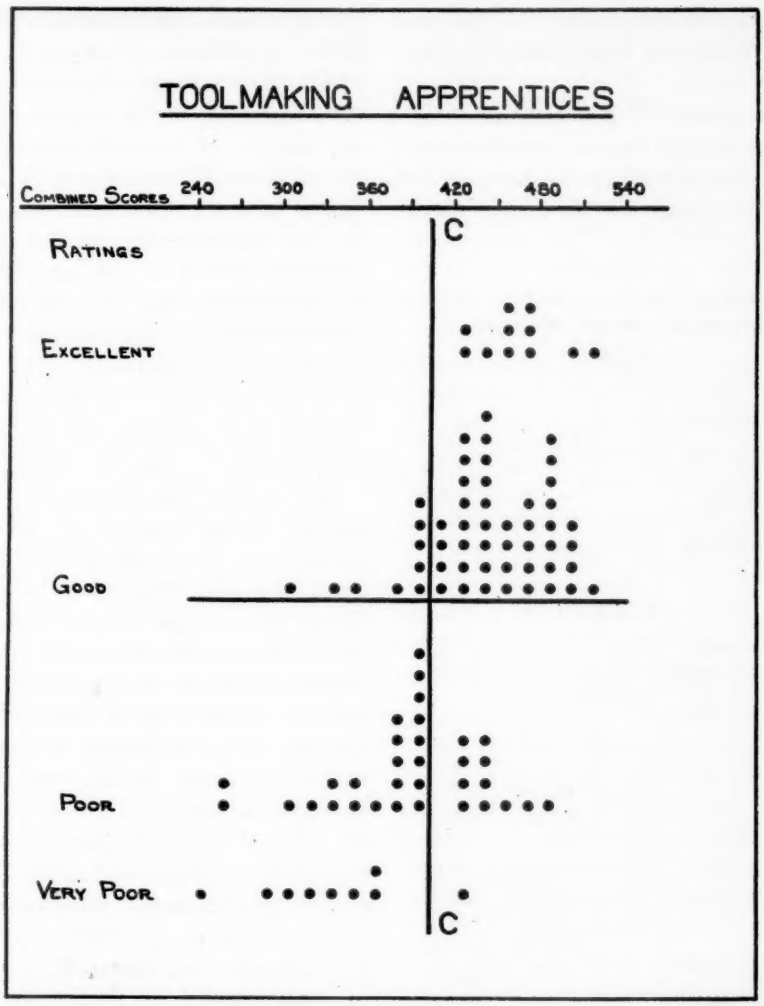


FIG. 1. SCATTER DIAGRAM OF 105 TOOLMAKING APPRENTICES ON THE COMBINED SCALE, TESTS 1, 2, 3, 4, 8, ERRORS IN 2, AND AGE, SHOWING FOREMEN'S RATINGS

Critical score, 417, represented by vertical line *CC*, separates the majority of successful apprentices from the majority of the unsuccessful.

with other criteria of success except in so far as the criteria themselves are related. In the present instance early termination of apprentices is plainly conditioned by the quality of work done, and the combined scale is therefore predictive of stability to some extent. In the preferred range, only 29 per cent of the apprentices terminated during the first year of the course, as against 46 per cent in the group as a whole, and 62 per cent in

the non-preferred range. Reliability of the preferred range figure is high ($D/\epsilon = 4.5$).[1]

*Correlations.* The percentage treatment of results can be supplemented by certain correlation coefficients, but the method has not been used extensively with the material of this study. Correlations of foremen's ratings with scores in a representative selection of four of the measures studied and in the combined scale, are given in table 4. Correlation of the percentage of satisfactory workers with scores, using for frequencies in the scatter diagram the number of cases in each class interval, gives the coefficients in table 5. These have not been tested for linearity, but undoubtedly the low correlation for Test 8 is due to the type of relationship already referred to, and there may be other non-rectilinear correlations in the series. The coefficient for errors in Test 2 is negative because high ratings are associated with few errors, and vice versa.

TABLE 4

*Correlation of certain employment measures with foremen's ratings, in Groups II and III*

| | r | P.E. |
|---|---|---|
| Test 4 | +0.338 | ±0.06 |
| Test 8 | +0.014 | ±0.07 |
| Errors in test 2 | −0.233 | ±0.06 |
| Age | +0.176 | ±0.06 |
| Combined scale | +0.478 | ±0.05 |

TABLE 5

*Correlation of employment measures with per cent satisfactory workers, in Groups II and III*

| | r | P.E. |
|---|---|---|
| Test 1 | +0.442 | ±0.05 |
| Test 2 | +0.563 | ±0.05 |
| Test 3 | +0.441 | ±0.05 |
| Test 4 | +0.833 | ±0.02 |
| Test 5 | +0.486 | ±0.05 |
| Test 6 | +0.377 | ±0.06 |
| Test 7 | +0.585 | ±0.04 |
| Test 8 | +0.040 | ±0.07 |
| Errors in test 2 | −0.824 | ±0.03 |
| Age | +0.469 | ±0.05 |
| Schooling | +0.341 | ±0.06 |
| Combined scale | +0.937 | ±0.008 |

The results thus far reported were secured from Groups II and III. together in December, 1926. Similar work done in November, 1925, on Group II only, gave a combined scale involving five of the seven measures found significant by the later work, namely, Tests 1 to 4, and errors in Test 2. Critical sections in the single scales for Group II are very similar to those of Group III in position of the critical scores, in the size of the section percentages, and in the character of relationships. Moreover, the combined scale of 1925 applied to both groups, and the combined scale of 1926 applied to Group II only, give distributions which agree closely with the original distributions of each scale. Since this is true in spite of the changes in management already described, we have evidence of a certain practical reliability in the scales. Indirect evidence of validity is available in certain termination percentages among boys of apprentice grade who were hired during the same period as the members of Group II, but who for any reason at all were not placed

[1] These figures are obtained from Group II only, because the necessary allowance of one year for the accumulation of terminations is not yet possible for Group III.

in the apprentice course. Nineteen boys in Group II who scored in the preferred range for apprentice tool-making according to the 1925 scale had lost 32 per cent of their number by November 18, 1925. Fifty-seven other boys, aged 16 to 20, the total number hired over the same period who also scored in the preferred range for this occupation but were assigned to machine operating, bench work, errands, etc., (not including clerical work), had lost 77 per cent of their number by the same date. The difference between either of these figures and the percentage termination of all 96 of these boys is reliable ($D/\epsilon = 3.5$, $D/\epsilon = 3.6$).

*Application.* The combined scale of November, 1925, was adopted for use at that time, and influenced the selection of most of the apprentices of Group III. This limitation of part of the sample to preferred range scores would tend to lower correlation rather than to raise it, and would therefore not invalidate results. It would tend also to render more reliable the numerical results with regard to the preferred range.

Use of the placement scale was not accompanied by a shortage of suitable applicants, as had been feared. Probably this is due to the great flexibility of the scale, for the number of ways in which a preferred score can be obtained by adding together different section percentages in the seven single measures is tremendous. It may also be due to the fact that the interviewer gave the test opportunity to more of the applicants than he would have recommended for the more expensive trial of an actual employment period. At all events, the abundance of test preferred applicants gave ample range for further selection on the part of the interviewer, or rejection on physical grounds.

Rejection from apprenticeship because of test score does not necessarily mean non-employment by the company, for the placement scales developed for other boys' occupations overlap with one another and with the apprentice scale to such an extent that probably any applicant who did not qualify for one particular occupation would fall within the preferred range of one or more others. Thus for Test 4 only, the preferred range for apprentices is from 165 to 195, for eyelet machine operators, 155 to 169, for clock lathe operators, 150 to 179, rod-feeders, 135 to 194, certain floormen, 130 to 174, stringers, 110 to 149, all open to boys. Consider that each of these occupations uses other measures besides Test 4, and that each combined scale is exceedingly flexible in itself,—and the fear of unfair limitation vanishes. Of course, limitation does occur in the number of openings available at a given time.

Reports from the foremen indicate that they feel a relief from the burden of carrying along two or three unteachable apprentices at all times, and that there is some basis for this statement appears in the fact that 18 per cent of the boys of Group II were rated very poor, whereas none of Group III were so rated. Also, the foremen and instructors believe that they have definitely raised the standards of workmanship within the year. This cannot at present be demonstrated, and would be ambiguous at

best, since if true it may be due to the improved methods of management or to the selection of new apprentices, or both.

The combined scale of 1926 is probably better than that of 1925.

*A comparison of method.* Studies of occupational requirements have frequently been made on groups of active employees at a given date, exclusive of those who may have attempted the work and dropped it. The hypothesis has been either that differences in ability within the active group may be used as a criterion of success regardless of the absence of those who have left the work; or that an observed concentration of qualities in the existing group may be predictive and at least indicates that these qualities are not detrimental to survival and success.

An observation made in the apprentice study in December, 1925, was that only 3 of the 35 boys of Group $I_a$, apprentices on roll and tested December 1, 1923, had failed to make good in the training course. That is to say, Group $I_a$ was to such an extent a selected group by the date of testing that in the 1925 ratings it was 91 per cent satisfactory. This lowered the range of ratings so seriously that relations found in Groups II and III between test scores and ratings, could be recognized in Group $I_a$ *only after the later groups had been studied.* On the combined scale, to be sure, Group $I_a$ had no members at all in the lowest critical section (probably there were some there originally), and relatively few in the middle section. It is difficult to see, however, how the scale could have been constructed from this group. In addition to this, in an early series of foremen's ratings not here reported in full, only very low and unreliable correlations between test scores and ratings were found in Group $I_a$.[2]

In view of these facts, certain comparisons were made between methods, in Groups II and III and the truncated Groups $I_a$, $II_a$, and $III_a$ described above. Table 6 gives part of the material, and should be compared with table 2. For each truncated group in each test, the per cent of the group found in each critical section was calculated. In Test 1, all three groups show a concentration of numbers in the middle section, 61 to 69 per cent in each. In the third section only 23 to 39 per cent of the groups are found. When we recall from table 2 that the best range for this test is the third section, it is clear that the concentration in the second section for Groups $I_a$, $II_a$, and $III_a$ is not so dependent upon the percentage satisfactoriness of the work, as upon another factor, the number originally hired in that section.

In Test 8 the concentration of the stable apprentices does occur in the preferred range, but this is true also of the original hirings. The distribution given for age shows again the persistency of concentration in spite of unequal losses, for we know that the preferred range is the second section and not the first.

In none of the distributions for Tests 1 to 8, age, schooling, or errors in

[2] Pond, M. *The Use of Intelligence Tests in the Selective Placement of Metal Workers.* Unpublished dissertation deposited in the Yale University Library.

Test 2, did the greatest percentage of employees active at a given date twelve months or more after the dates of hiring fall in the preferred range based on ratings, except where the number originally hired was greatest in that range. Therefore this percentage gave no indication whatever of the relative waste entailed in the process of adjustment. The latter could be determined only from the records of the entire group.

of training. Incentives in the course were constant, and the ratings were based upon careful and intimate observation, influenced by cost records.

Conclusions were as follows:

*Validity and reliability*

1. Scores in certain general intelligence tests bear valid and reliable relation to foremen's ratings on workmanship.

TABLE 6

*Distribution of Groups $I_a$, $II_a$, and $III_a$ in Tests 1, 8, and age, in terms of per cent found in each critical section*

| | | PER CENT OF GROUPS $I_a$, $II_a$, $III_a$ | | | | NUMBERS ORIGINALLY HIRED | | |
|---|---|---|---|---|---|---|---|---|
| | | Critical sections | | | | Critical sections | | |
| | | 1 | 2 | 3 | | 1 | 2 | 3 |
| Test 1 | Group $I_a$ | 3 | 69 | 29 | | | | |
| | Group $II_a$ | 8 | 69 | 23 | Group II | 10 | 32 | 8 |
| | Group $III_a$ | 0 | 61 | 39 | Group III | 1 | 37 | 17 |
| Test 8 | Group $I_a$ | 0 | 57 | 43 | | | | |
| | Group $II_a$ | 11 | 77 | 11 | Group II | 7 | 36 | 7 |
| | Group $III_a$ | 6 | 85 | 9 | Group III | 5 | 41 | 9 |
| Age | Group $I_a$ | 51 | 49 | | Group I | 29 | 28 | |
| | Group $II_a$ | 77 | 23 | | Group II | 35 | 15 | |
| | Group $III_a$ | 58 | 42 | | Group III | 35 | 20 | |

SUMMARY

In this study, foremen's ratings on workmanship expressed in four divisions—excellent, good, poor, very poor—or in two—satisfactory, unsatisfactory—were compared with scores in a series of eight tests, five non-verbal in character, three verbal, and with certain other employment measures. The comparisons were made in groups of toolmaking apprentices who were tested at the beginning of their course

2. Non-verbal tests in the series are more significant than verbal tests.

3. The relation between scores in the tests and ratings is sometimes not a straight line relationship.

4. Age is an important measure.

5. Schooling, within the limits of the sample, is not significant.

6. Nativity of the father, and previous experience with the company in other capacities, are not significant.

7. A combination of scores from five tests, errors in one test, and age,

with differential weighting of critical sections, gives a valid scale for the prediction of satisfactory workmanship.

8. This scale shows high theoretical reliability.

9. It is also valid and reliable for the prediction of stability, though less so than for workmanship.

10. The components of the combined scale are separately reliable according to formula.

11. They are separately reliable in similarity of distribution in two successive groups of apprentices.

12. The combined scale, constructed for two groups of apprentices together differs only slightly from a tentative combined scale previously constructed in the same way for one group only, a further indication of reliability.

13. Comparison of termination rates in two samples of boys who scored within the preferred range on the apprentice scale, one group hired for apprentice training, the other for miscellaneous occupations, gives further evidence of the validity of the scale.

*Application*

14. Use of a tentative placement scale for one year has resulted in no shortage of preferred applicants.

15. The scale is flexible—failure to place is never on the basis of low scores in any one or even two of the tests.

16. Applicants not preferred for apprentice training can be placed suitably in other occupations open to boys.

17. Reports from foremen indicate that there are no very poor workmen entering the apprentice course at present, and that it has been possible to raise the standard of performance.

*Methodology*

18. In a study of this sort, a selected group of employees which does not take into account the early terminations from the group may entirely fail to show relationships which exist significantly among applicants, or it may even appear to reveal relationships which do not exist.

(*Manuscript received January 15, 1927.*)

# News Notes

PERSONNEL RESEARCH FEDERATION

ACTIVITIES OF MEMBER ORGANIZATIONS

*New York University*

*Course in Accident Prevention*

New York University in coöperation with the American Museum of Safety will offer the first college course in accident prevention. This step is taken with the realization that the enormous losses to industry from accidents can be prevented only through continuous organized educational effort, and that the demand for trained leaders to direct this work is growing.

The course will be open to all graduate and undergraduate students at New York University, and to others who through previous training or present associations are professionally interested in accident prevention.

*Course in Personnel Management*

New York University announces a series of lectures and discussions on the technique of personnel management, to be known as Management 26. The course will be given on Tuesday evenings from February 1 to May 10, 1927, and will be in charge of Mr. Harold B. Bergen, Manager of the Personnel Department of Henry L. Doherty and Company. The subjects to be considered will include critical evaluation of the various methods of selection, job analysis technique, job classification and grading, wage standardization and administration, development of tests, employment procedure, including the art of interviewing, essential personnel department records, rating systems, transfer and promotion, and development of incentives.

*Student Personnel Service*

The School of Education of New York University announces the establishment of a student personnel service under the direction of Professor Anna Y. Reed. This rounds out the program of personnel service which was first instituted when Mrs. Reed was called to the University in 1924. The purposes of the newly established services are as follows:

1. To afford a central office for pooling the adjustment problems of the student personnel and the facilities available for their solution. It is not intended in any particular to duplicate existing services, to relieve individual faculty members of advisory responsibilities, or to impede the efficiency of advisory committees. It is intended to aid individual instructors and faculty committees whenever they feel that this specialized service can desirably supplement their own efforts. This feature of the Service in the School of Education will take the place of many forms of personnel service formerly assigned to deans of men and women and will do away with the appointment of such officers in the School of Education. This student advisory service has been made available to all schools of New York University to the extent that they care to take advantage of it. Individual students have found their way to the bureau but the ordinary channel is through the classroom instructor. Problems already dealt with have involved vocational choice, home difficulties, and social, religious and educational adjustments. Under the one person as adviser scheme these problems would all be dealt with by the faculty member best qualified to offer the service needed.

2. To afford a pre-collegiate information service for prospective but undecided students. Vagueness in vocational objectives makes the choice of schools, Commerce, Arts, Education, etc., very difficult and the Service has been able to help some students find a basis for an intelligent selection.

3. To afford teachers in service, regis-

tered in the School of Education, and our own instructional corps, a central office through which the expert advice of faculty specialists may be secured in solving difficult adjustment problems in connection with *their* students. And also to afford a bureau through which application for assistance not available within the University may be made. Teachers and counselors in the field are displaying particular interest in this phase of the service and are seeking methods and materials for solving their most difficult guidance problems. Extension classes are also conducted for teachers in service who wish help with advisory and guidance phases of their classroom responsibilities.

4. To discuss with inquiring educators and school counselors tentative plans for guidance and personnel programs in their schools and to aid in the adaptation of such plans to local needs.

5. To offer, for students preparing for college or normal school teaching or advisory work, some practical experience in the application of modern personnel principles and practices to college and normal school student problems. This phase of the Service is an integral part of the newly instituted curriculum of the School of Education for training college and normal school teachers.

The field of personnel service in education is relatively new and unexplored and the School of Education program is feeling its way slowly, letting the effectiveness of the service rendered be the basis of expansion. The personal encouragement, assistance and coöperation of various faculty members in all schools of the University, however, is making possible an important and distinctive contribution to the work of the University.

*Oberlin College*

During the past year the department of psychology has been working on several research projects. The first has to do with the occupations of alumni. In connection with the publication of the alumni catalog the location of 99 per cent of the graduates was ferreted out. Each who answered filled out a questionnaire on his occupational history. From these data an occupational classification of alumni by decades has been made. For the women an occupational classification has also been made, and the marriage increment by decades computed.

A second project under way consists of a comparison of occupational groups of alumni of the classes from 1920 to 1926. Intelligence test scores and scholastic records for these people have been tabulated. All who started a professional course are to be followed up, and their graduate school success will be correlated with the data in hand. The great majority of Oberlin men do graduate work of some sort. One-fifth of those graduating within the past decade are now either in college teaching or are preparing for it.

A third project consists of a scheme for classifying vocational activities in terms of the types of purpose, activity, and social relations involved. It may be used, first, as a factor in the job analysis of the complicated vocations, and second, as a vocational interest inquiry for college students.

### VOCATIONAL COUNSELING AT THE UNIVERSITY OF COLORADO

The University of Colorado has appointed Mr. Fred E. Aden to the newly created position of vocational counselor to students.

### TESTS FOR STENOGRAPHERS AND TYPISTS

The April number of the JOURNAL OF PERSONNEL RESEARCH will contain a summary of information on available tests for stenographers and typists. The information on each test will include references to published material, description of the test, norms, how the test was evaluated, where it may be obtained, and the price.

# Book Reviews

## METHODS OF TEACHING INDUSTRIAL SUBJECTS

*By Arthur F. Payne. New York: McGraw-Hill Book Company, Inc., 1926. Pp. 293*

REVIEWED BY GEORGE E. MYERS

A well-known professor of anthropology, in response to criticism of the content of his courses, once defined anthropology as "anything which has to do with the human race." It appears that the author of this book defines methods of teaching industrial subjects in such a manner as to include anything which has to do with industrial education—and some other things also.

Beginning with Solon and giving attention to Martin Luther, Comenius, Locke, Rousseau, Leibnitz, Basedow, Pestalozzi, Herbart, Froebel, Spencer and others down to Calvin Woodward, he presents the points of view of educational reformers concerning the use of industrial processes for educational purposes. He tells of the organization of the National Society for Promotion of Industrial Education and of the passage of the Smith-Hughes Law. These are matters of the history and principles of education rather than of methods of teaching industrial subjects.

A chapter of some length is devoted to provisions of the federal and state boards of vocational education for the training and certification of teachers. This is organization and administration of vocational education. Other chapters deal with the psychological laws and conditions of learning, and with attention, interest, and effort—educational psychology. More educational psychology is found in a later chapter which deals with adolescence, intelligence levels, intelligence in relation to occupation and the like. And more administration and supervision is found in chapters on rating and observation of teachers and teacher examinations.

To be sure, most of this material should form part of the training of industrial teachers; but few who are engaged in training these teachers would classify it as part of a methods course.

Approximately one-half of the book is made up of chapters which contain genuine methods material discussed under such headings as lesson types, lesson plans, lesson sheets and other lesson material, methods of presentation, the question as a teaching device, management of the school shop, grades and grading systems, job analysis, and teaching shop work on a production basis as contrasted with an exercise basis.

But even in these chapters much is presented that is very remote from methods of teaching. Take, for example, the chapter on job analysis. The author discusses ten steps in research: (1) Observe and isolate certain phenomena, (2) analyze the phenomenon or problem, (3) formulate a method of attack, (4) collect pertinent data, (5) record observations, (6) compile and interpret the data, (7) develop and summarize the conclusions, (8) generalize the findings, (9) indicate a practical use for the findings, (10) try out and check the findings in practical situations. He then tells us that job analysis is based upon these steps but does not show how it is based upon them or indicate what significance they have for job analysis. In the same chapter several pages are given over to "job specifications,"

which are lists of qualifications desired in candidates for certain positions such as carpenter, general blacksmith, and draftsman. This material does not constitute the sort of analysis of these occupations which one wishes who is preparing teaching material. (It may be noted here that the author seems to use the terms job analysis and trade analysis interchangeably.)

Again, in the same chapter, considerable attention is given to the purely industrial implications of job analysis, in relation to equalizing wage payments, promotional sequence, hazards, etc., and to the vocational guidance implications of trade or occupational analysis, and to analysis of the general industrial field. These, to be sure, are important and may properly be mentioned as illustrative of the applications of analysis, but they are given much more attention than they deserve in comparison with the aspects of trade and job analysis which are significant for methods of teaching.

The chapter on job analysis contains some good material which should be useful in a methods course. This is true especially of certain *trade* analysis charts. But as a discussion of job analysis in relation to methods of teaching it is far from satisfactory. Not only does it contain much irrelevant material; it lacks much that should be found in it. In fact, this chapter is a good illustration of the lack of the very thing discussed—analysis.

The book as a whole shows hasty preparation. There is considerable good material in it, especially illustrative material in the nature of lesson sheets, trade analyses, and the like, brought in from various sources. The reading lists in the appendices are valuable, though bibliographical material of this sort is always more valuable where carefully selected. But from table of contents to appendix there is serious lack of thoroughgoing analysis; there is poor organization and little coherence; irrelevant material is brought in, apparently to fill up space. The book is not a contribution to the literature of methods of teaching industrial subjects; it is just another book on the subject.

## SELF-DIRECTION AND ADJUSTMENT

*By Norman Fenton. Yonkers-on-Hudson, N. Y.: World Book Company, 1926. Pp. vi + 121*

Reviewed by Douglas Fryer

A manual for self-guidance in mental training or education is an ambitious undertaking. It must contain all that can be applied from psychology and hygiene and the best that is the result of common-sense observation. In addition it must be positive in statement and have a simple brevity in explanation. The reviewer is impressed with the fact that this book fulfills these requirements better than anything else available.

*Self-Direction and Adjustment* commences with the expression of a basic principle of guidance that the individual's future efficiency and happiness depends upon his discovery of his talents and that, while defects can be overcome in degrees, one should emphasize self-training of best qualities. Good habits of work are stressed. Hygienic suggestions, both mental and physical, are made. The problem of mental work or effective study and of becoming a self-directing unit in mental work is discussed in detail. Other learning and study problems considered are memorizing systems, reviewing, note-taking, attention to lectures, cramming and self-dependence in examinations. One of the outstanding factors in efficient mental work is reading. Self-tests of reading ability are included in the text and information offered for a sound analysis of this process. Further quantitative aid to self-analysis is offered by the inclusion of self-examinations of

vocabulary and general intelligence accompanied by norms for diagnosis. All in all this book is an excellent stimulus to self-analysis by the individual motivated towards perfection.

Fault may be found, however, with this book written for reading primarily by the high school student. Knowledge of the college student's needs furnishes the background of the stimuli and suggestions, although written in language understandable, it would seem, by the high school student. A more serious fault, particularly for use during early and middle adolescence lies in the quantity of suggestions offered. All appear of equal importance. There are no outstanding stimuli, though the suggestions are well-organized. Like a bad symphony there are no high spots, no climax, which is necessary to most books and particularly in those written for the adolescent. But, the book, however, viewed as a whole is the outstanding piece of work of its kind, and includes a wealth of applicable information for any reader in facing the problem of efficient mental work.

## PRACTICAL PSYCHOLOGY

*By Edward Stevens Robinson. New York: The Macmillan Company, 1926. Pp. xii + 479*

REVIEWED BY FLORENCE H. HOOKE

This volume, though primarily intended as a text-book for late high school and early college students—and especially for those who expect to go almost immediately into business or the professions—is of distinct value to other classes of readers. To the person engaged in psychological work of a special or intensive sort it affords a well-balanced resume of the entire field; to the general reader, a keener view of himself and his world and an admirably sane scientific background for further psychological reading.

The book's outstanding plea—if such a book may be said to make a plea—is for a further application of the scientific spirit and method to the affairs of everyday life. "The habit of remembering," says Professor Robinson, "that there is a scientific way of solving many of the problems of human nature will keep us on the lookout for better methods of emotional control, for better methods of study, and will in general prevent our treating human nature, either in ourselves or in others, in a shortsighted and prejudiced manner."

The book's subtitle, "Human Nature in Everyday Life," not only expresses the idea of its contents, but suggests the lively spirit, at once informal and scientific, in which the author seeks to present his material. Telling human illustrations, accessible arrangement of ideas and for the most part clear and untechnical language make this something more than the ordinary scientific text-book.

Habits, their formation, fixation, elimination, operation, and organization into systems, receive the author's primary attention, and perhaps it is the chapters which deal specifically with these topics, together with the one on "Abilities and Their Measurement" which will chiefly interest the personnel man. However, the author's treatment of "Imagination," "Reasoning," "Feeling" and "Personality"—each an excellent chapter, rich in constructive ideas—will doubtless prove more suggestive and interesting to the lay reader.

# New Books

AMEN, ELISABETH W. *An Experimental Study of the Self in Psychology.* Psychological Monographs, Vol. 35, No. 4. Princeton: Psychological Review Company, 1926. 72 p. $.75.

BOVARD, J. F., AND COZENS, F. W. *Tests and Measurements in Physical Education, 1861–1925.* Physical Education Series, Vol. 1, No. 1. Eugene, Ore.: University of Oregon, 1926. 94 p.

BROWN, ANDREW W. *The Unevenness of the Abilities of Dull and Bright Children.* New York: Bureau of Publications, Teachers College, Columbia University, 1926. 112 p. $1.50.

BUREAU OF WOMEN IN INDUSTRY. *Homework in the Men's Clothing Industry in New York and Rochester.* Special Bulletin No. 147. Albany: State of New York, Department of Labor, 1926. 69 p.

CRAWLEY, S. L. *An Experimental Investigation of Recovery from Work.* Archives of Psychology, No. 85. New York: Archives of Psychology, 1926. 66 p.

DAVIS, MICHEL M. *Clinics, Hospitals and Health Centers.* New York: Harper and Bros., 1926. 562 p. $5.00.

FEDERAL BOARD FOR VOCATIONAL EDUCATION. *Agricultural Education.* Bulletin No. 13, Agricultural Series No. 1. Washington: Government Printing Office, 1926. 69 p. $.10.

FEDERAL BOARD FOR VOCATIONAL EDUCATION. *Employment Training in Civilian Vocational Rehabilitation.* Bulletin No. 110, Civilian Vocational Rehabilitation Series No. 11. Washington: Government Printing Office, 1926. 64 p. $.10.

GARESCHÉ, EDWARD F. *Training for Life.* New York: P. J. Kenedy, 1926. 145 p. $1.75.

GILLIN, J. L. *Poverty and Dependency, Their Relief and Prevention.* Revised Edition. New York: The Century Company, 1926. 846 p. $4.00.

HARRISON, SHELBY M., AND EATON, ALLEN. *Welfare Problems in New York City Which Have Been Studied and Reported Upon During the Period From 1915 Through 1925.* New York: Welfare Council of New York City, 1926. 96 p.

HUXLEY, JULIAN S. *Essays in Popular Science.* New York: Alfred A. Knopf, 1926. 332 p. $4.00.

JONES, ARTHUR J. *Education and the Individual.* New York: The Century Company, 1926. 239 p. $2.00.

KEPPEL, FREDERICK P. *Education for Adults, and Other Essays.* New York: Columbia University Press, 1926. 94 p. $2.00.

KOCH, HELEN L., AND SIMMONS, RIETTA. *A Study of the Test Performance of American, Mexican and Negro Children.* Psychological Monographs, Vol. 35, No. 5. Princeton: Psychological Review Company, 1926. 116 p. $1.75.

LORAND, ARNOLD. *Defective Memory, Absentmindedness and Their Treatment.* Philadelphia: F. A. Davis, 1926. 347 p. $3.00.

MULLINS, GEO. W. *Unemployment; The Gateway to a New Life.* New York: Longmans Green and Company, 1926. 153 p. $2.50.

NATIONAL EDUCATION ASSOCIATION OF THE UNITED STATES. *Character Education.* United States Bureau of Education, Bulletin No. 7. Washington: Government Printing Office, 1926. 95 p. $.15.

NIENBURG, BERTHA M. *The Status of Women in the Government Service in 1925.* United States Department of Labor, Bulletin of the Women's Bureau, No. 53. Washington: Government Printing Office, 1926. $.15.

PLACE, RICHARD L. *Selling the Salary Insurance Plan.* New York: F. S. Crofts, 1926. 182 p. $2.00.

POVAH, MAJOR JOHN W. *The Old Testament and Modern Problems in Psychology.* New York: Longmans Green and Company, 1926. 159 p. $2.00.

SARGENT, HARVEY O. *Vocational Education in Agriculture for Negroes.* Bulle-

tin No. 111, Agricultural Series No. 28. Washington: Government Printing Office, 1926. 101 p. $.15.

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# Stability of Office Workers and Age at Employment

By Marion A. Bills, *Aetna Life Insurance Company*

*When looking for stable office workers, should preference be given to younger or older applicants? How old are the most stable workers when they apply for employment? Should different age standards be established for employment of men and women office workers? These are questions of vital importance to any employer of a large office force. Dr. Bills gives some conclusive answers from the experience of an important life insurance company.*

Records of 196 men and 420 women office workers hired by the Aetna Life Insurance Company in 1920, 1921, 1922, and 1923, were studied to trace the influence of age at employment on permanency of service with the firm. It was found that of men under nineteen years of age at employment, 17 per cent were still with the firm in December, 1926; of those between nineteen and twenty-five, 27 per cent; and of those over twenty-five, 54 per cent. The corresponding figures for women were 29, 19, and 37 per cent. Various theories are given to account for these results.

DURING the years 1920, 1921, 1922, and 1923, the Life Department of the Aetna Life Insurance Company, Hartford, Connecticut, employed 635 persons. Of this number we have definite information on 420 women and 196 men as to age at employment. A casual survey of the people who left seemed to indicate that 19 and 25 were critical ages. We therefore made a comparative study of the percentages of those remaining with the company who at the time of employment were (1) under 19, (2) between 19 and 25, and (3) over 25. Table 1 gives these percentages for both men and women.

It will be noticed at once that there is a decided difference between the sexes. If a man under nineteen years of age is hired, his chances of remaining are only 17 per cent. If hired between 19 and 25, the chances of remaining are 27 per cent, and if hired over 25, they are 54 per cent. With the women the highest percentage of permanency is found among those who are under 19 and over 25.

Several persons who have had considerable experience both with the hiring and with the supervision of these employees offered the following explanations of the difference in the permanency of men at different ages:

The boy just coming from school views a job as much more interesting, attractive, and leading more quickly to promotion than is actually the case. If he joins the company just as he comes from school at 16 or 17 years of age, it often happens that the job does not come up to his expectations, and feeling that the trouble is with the job, he leaves it to take another one which momentarily looks better to him. He may do the same with the second and even the third job, but in the early twenties the gloss will have worn off his ideal of a job, and he will come to realize that the only way for him to get ahead will be to take a job and stick to it through a number of rather tedious years. The company which employs him when in this frame of mind will be likely to find a permanent employee.

TABLE 1

*Relation of age at employment to permanence of service, for men and women office workers*

| | UNDER 19 AT EMPLOYMENT | BETWEEN 19 AND 25 AT EMPLOYMENT | OVER 25 AT EMPLOYMENT |
|---|---|---|---|
| **Men** | | | |
| Number employed | 101 | 67 | 28 |
| Number remaining | 17 | 20 | 15 |
| Per cent remaining | 17 | 27 | 54 |
| **Women** | | | |
| Number employed | 214 | 157 | 49 |
| Number remaining | 61 | 30 | 18 |
| Per cent remaining | 29 | 19 | 37 |

Another explanation may hold good only for Hartford. The young man comes to us from high school and after a year or so discovers that some of his high school companions are working in the factories and are making considerably more money than he is. He leaves and goes into factory work. After a year or two he discovers that the chances of advancement are very limited, and he turns back to clerical

TABLE 2

*Average age at employment of men leaving and men remaining with firm*

Men

| YEAR OF EMPLOYMENT | REMAINING | | LEAVING | |
|---|---|---|---|---|
| | Number | Average age at employment | Number | Average age at employment |
| 1920 | 17 | 26 | 64 | 19 |
| 1921 | 2 | 32 | 13 | 19 |
| 1922 | 6 | 23 | 23 | 21 |
| 1923 | 26 | 24 | 61 | 20 |

TABLE 3

*Stability of women office workers in relation to age at employment*

Women

| YEAR | | UNDER 19 AT EMPLOYMENT | BETWEEN 19 AND 25 | OVER 25 |
|---|---|---|---|---|
| 1920 | Number employed | 116 | 62 | 24 |
| | Number remaining | 14 | 6 | 10 |
| | Per cent remaining | 12 | 9 | 41 |
| 1921 | Number employed | 25 | 30 | 8 |
| 1922 | Number remaining | 12 | 2 | 2 |
| | Per cent remaining | 50 | 7 | 25 |
| 1923 | Number employed | 73 | 65 | 17 |
| | Number remaining | 35 | 22 | 6 |
| | Per cent remaining | 48 | 33 | 35 |

work. Again, the company which engages him on the rebound is likely to get a permanent employee.

One constantly hears ambitious men doing clerical work express the opinion that they could not possibly be contented with their present jobs unless they had tried out one or two other jobs with other firms or for themselves. In contrast to conditions twenty years ago, the man who now works for only one company a great part of his life usually develops—unless his promotion is very rapid—a feeling that he could have done better elsewhere; this leads to a feeling of unrest and, if the man is not too old or has not too great responsibilities, to his leaving the company.

Table 2, which shows the average age by years of employment for those who have remained with the company and those who have left, is simply the data of Table 1 in a different form. It will be noted that for each year of employment those remaining are older than those leaving.

The explanation of the relation of age and permanency of service for the women as shown in table 1 is much harder to find. That these are not chance results is shown by the fact that the results are consistent for all four years of employment (see table 3).

The figures immediately suggest the idea that the percentage leaving is greater during those years when workers of the social status of the clerical group tend to marry, that is, somewhere between 19 and 25. But this explanation falls down when one studies the actual facts. For example, of the 172 employed in 1920 who subsequently left, only 20 left to get married, a little less than 12 per cent. If the 20 who left to be married are distributed according to age, we find that 11 were under 19 years of age at the time of employment, 7 were between 19 and 25 years of age, and 2 were over 25 years; that is, 11 per cent of those under 19 left to get married, 12 per cent of those between 19 and 25, and 14 per cent of those over 25. It therefore would seem that there is no direct relationship between age at hiring and percentage leaving to get married.

A somewhat doubtful explanation comes immediately to mind. As a whole the women doing moderately well tend to hold their positions and not become dissatisfied; those leaving are as a whole less satisfactory both in this job and their new one. This explanation does not account for the increased percentage remaining among those over 25 at hiring.

No further explanation of the situation has been attempted.

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# Skill

By T. H. Pear, *University of Manchester, Manchester, England*

*Professor Pear is one of the prominent group of British psychologists who have done valuable work in business and industrial psychology in recent years. In this article he brings together various theories of the nature of skill and presents a classification of the kinds of skill wanted by industry.*

ONE aim of this article is to inquire how far the word "skilled" as used to describe performances in work and play, bears any definite meaning. Suggesting that a more precise delimitation of "skill" is desirable for those concerned, either practically or theoretically, with problems of industry, it will attempt to indicate some lines along which a beginning might be made.

In accepting the kind invitation to contribute to an American journal, I realise that what I write may apply less to American than to British psychology and industry. Some of the questions to be raised are common to all civilised countries. Others, however, are not, and it is clearly necessary, when describing any problem of industrial psychology, to specify the country in which it has arisen.[1]

I will attempt in this paper to confine myself to issues affecting most nations equally.

[1] Myers, C. S. *Industrial Psychology in Great Britain*. London, 1926. Gilbreth, Lillian M. Review of *Skill in Work and Play*. Bulletin of the Taylor Society, 1925, Vol. 10, p. 236.

## Ambiguity of the word "skill"

The word skill is used to characterise performances of very different kinds both in work and in play. Indeed, judging from the diverse meanings which it bears in industry alone (from one article I culled nineteen) at present it hinders exact thought. Yet it is so delightfully terse—compare it with *Geschicklichkeit!*—and so unlike other words, that it should not be abandoned. But I would suggest that, treating it with more respect, we should apply it to the higher types of performance. The reasons will appear later.

Let us first indicate some senses in which we should like to see the word skilled *not* used.

(a) To describe the work to be done rather than the worker.

(b) As a label for an occupation which existed as a trade before the modern factory era; which then demanded much skill and now requires little.

(c) As a label for a collection of operations involving very different degrees of skill, this collection superseding a rela-

tively unitary occupation which once did demand high skill.

(d) To describe an operation in which so-called skilled workers operate in groups. This involves considerable psychological and other complications, as Dr. G. H. Miles[2] has recently pointed out.

Either from a sense of comradeship or from fear, the really skilled workers in such a group do not produce to their full capacity. Rates of payment are based on the capability of average workers, and in many cases the earnings within a group are extraordinarily uniform. The resulting waste is multiplied. The capacity of the really skilled worker is lowered; much of the energy of average workers is squandered; and those below average feel that they are being remorselessly driven.

### SKILL AND OUTPUT

In industry the consideration of skill (where it *is* really considered, and not merely assumed) not unnaturally includes an explicit reference to output. But concepts of output vary, and will repay examination.

Sometimes output refers simply to the quantity of articles produced, the quality being taken for granted. The article is either right or wrong. If wrong, it is returned to the worker, who puts it out again.

Such a concept lends itself pleasingly to simple arithmetic and to graphical illustration. Yet it may rejoice the accountant and the economist more than the psychologist. For the standard of quality being "all or nothing," has all the advantages and defects of the simple philosophy which that famous phrase describes.

A looser concept of output implies a combination of qualitative and quantitative criteria; in which the former are vaguely or never analyzed out. In an English investigation of metal-polishing[3] it was found that, there being no minimum standard of quality, some workers were consistently over-polishing, thereby decreasing their output. So it might be that a higher degree of skill and carefulness was displayed by some workers who ranked low on the output chart.

Wherever there is intermingling of desirable quality and desirable quantity, the skill required will be correspondingly complex and variegated. Let us take an example. With the aid of stenographers, indexers, abstracters, and translators, it would be possible to produce, every three months, some kind of book upon any scientific subject. This performance would undoubtedly require skill, a technique of which could be elaborated. But its nature would be entirely different from that involved in producing a book in three years.

### SKILL AND LOW-GRADE HABITS

Some so-called skills are merely a fortuitous concourse of habits. And often some of them are not good habits. Possibly no single one of them is well adapted to the task, and the whole collection is only a make-shift. If

[2] Miles, G. H. *The Acquisition of Muscular Skill in Industry.* Journal of the National Institute of Industrial Psychology, 1926, Vol. 3, pp. 45ff.

[3] Farmer, E. *Motion Study in Metal Polishing.* Industrial Fatigue Research Board, Report No. 15. London, 1921.

this be contrasted with the higher forms of skill (integrations, not mere collections, of responses, and not necessarily of habits only), each response being adapted as perfectly as possible to the task, to describe some industrial occupations as skilled would be flattery.

In England the psychological aspects of bricklaying are sadly darkened by economic and historical ones. Any skill which it evokes is usually displayed by politicians and others in avoiding the subject. The situation seems more cheerful in the United States. So in writing of bricklaying, it may be suggested that Mr. Frank B. Gilbreth's famous analysis[4] shows that the original workmen's performances which he studied could be called skilled only in the popular sense.

### THE NATURE OF SKILL

Let us now consider skill from the standpoint of psychology and physiology. Skill must be distinguished from *capacity* and *ability*. If I may be allowed to quote from an earlier publication:[5]

> This distinction is not difficult, for the differences are already recognized in the case of those activities which at present are called intellectual. If we learn that an individual, though he once had lessons in Greek, has no skill in using this language, we do not infer that he has no language *capacity*. If, on further examination, we find that he reads and speaks English, French, and German with ease, we may reasonably suspect that lack of time or of interest, or bad teaching, may account for his defect. If, later, we find that he knows many Greek words and can use them in correct sentences, we might believe in his *ability*, and would deny only that in this direction he possessed *skill*.
>
> These distinctions, applied to language, are obvious. But now let us think in a similar way about the question of muscular skill. How often is it assumed that, because a person *does not* perform certain skilled acts, he *could not* do them; and that since he has no skill or ability, he has no capacity! Conversely, how often do we suffer vague talk attributing a natural gift or "instinct" for games to persons who from their youth up have done little else than cultivate them, and about whom the only puzzle is why, with all this practice, they do not play still better! The precise mutual relations of muscular capacity, ability, and skill offer many interesting problems to the sceptic who is not content merely to admire and to invoke semi-theistic explanations of middling performances.

I would suggest the utility of reserving the word "skill" for the higher grades of performance. To say that a man can run does not necessarily imply that he possesses skill in running. But if he has learnt a good way to use his limbs, to regulate his breathing, to sprint at a particular point or moment, and if he has learnt all this with respect to different kinds of track, different lengths of race and different classes of competition, he may be said to possess skill in running races. This would also be true if he had acquired such ability in a blinder and less intellectual way,[6] but that fact is irrelevant here.

The concept of skill which is proposed is that of *integration of well-adjusted performances*, rather than a tying together of mere habits. In man,

[4] *Applied Motion Study*. pp. 105ff.

[5] *Skill in Work and Play*. pp. 20–21.

[6] *Skill in Work and Play*. pp. 37–45.

at least, skill is acquired and fused with natural aptitude.

### SKILL AND REFLEX ACTIONS

Those reflex mechanisms which contribute to balance, to posture,[7] and to the efficient coördination of action are an important basis of skill. He who does not possess efficiently coördinated reflexes is likely to be less skilled than his more fortunate brother. Yet here the relation of acquired to inherited ability is complex. Race, education, dress, occupation, and transient fashion notoriously affect even such a fundamental activity as walking.

### SKILL AND INSTINCT

If man be compared with other animals it seems that, while some of them inherit a high degree of skill, he does not. Birds inherit skill in nest-building, the kingfisher building one type, the swallow another, selecting, moreover, different material. In contrast, man is notoriously helpless at birth. The skills which he acquires depend almost entirely upon his social and material environment. Thus in England nowadays an active young town-dweller is more likely than a countryman to be able to swim, a reversal of the former situation. And the way in which he swims will probably reflect prevalent fashion or his teacher's views.

A creature like the bird may, of course, fuse an acquired skill with its inherited skill.[8] Yet the individual modification of such inherited skill is relatively small, compared with similar possibilities in man.[9]

It should not be forgotten here that the highly skilled performer impresses his own personal stamp upon the product. In painting, sculpture, surgery, pottery, football, and dancing, the highly skilled perform with a characteristic style. In so doing they are creators.

Instinct, then, probably plays a relatively unimportant rôle in human skill. It may, however, exert enormous driving force in impelling a person to strive to acquire skill, in the face of difficulty and discouragement.[10]

### SKILL AND HABIT

We have already noticed that collections of habits may masquerade as skill. Now skill is largely composed of habits. But in skill worth the name they are of a special kind. They cause adequate adaptation. And when the conditions demanding adaptation are complicated they interact so that the whole skilled action is not the mere sum of its parts. A learner of lawn tennis may easily acquire many useful

[7] *Cf.* Magnus. *Croonian Lecture.* Proceedings of the Royal Society, 1925, Vol. 98B, p. 339. Evans, C. L. *Recent Advances in Physiology.* London, 1925.

[8] *Cf.* J. Arthur Thomson, *The Mind of the Bird*, in Radio Times, October 22nd, 1926, page 221, for a discussion of this in relation to the song-thrush's skill in breaking snail shells on its stone anvil.

[9] These facts are relevant to the question of whether man possesses an instinct of constructiveness. One may justly ask "Constructiveness for what?" Is it constructiveness for anything or for special things? If for special things, what are they?

[10] This subject will be discussed more fully in a forthcoming book entitled *Fitness for Work.*

separate habits, e.g., standing correctly when waiting to receive the service, gripping the racquet, and holding it in the right position. But if these habits are specific responses to specific situations, an expert opponent will speedily present a situation to which these responses are unfitted.

Skill, as distinct from habit, involves the ability to be aware of and to correct faulty adjustment. A surgeon's or automobile driver's skill implies this. While it consists partly of habits, skill permits immediate interference with any single habit or combination of them. And this makes it difficult to study. Some disputes about skill in industry are unnecessarily acrimonious because these facts are not realized.

For example, by simplifying the processes in certain tasks a person may be trained in a few days (instead of, as formerly, a few months) to perform them. By the new method the task may be done as well as or better than by the old one.

But more may have been learnt—for good or ill—by the old method. The habits in the new task may be only a few of those in the old one. Moreover, they may be completely different habits. So the skilled worker is often aggrieved by the assumption that his work can be learned in a short time. And if his work be highly skilled in the sense in which we have used this term, he is justified. Yet many statements about skill are part of a technique which employs it as a bargaining asset. Obviously the study of skill as a political pawn will throw little light upon its ultimate nature. The different factors which are rightly and wrongly classified as skill in industrial occupations will be discussed later in this article.

### PATTERNING A CHARACTERISTIC OF SKILL

A highly skilled action is distinguished by the integration of the part-actions. These whole-patterns often express inimitably the individuality of the performer. This can be seen on comparing the movements of two experts who are alleged to be performing the same dance. The separate steps which compose their dance bear the same names, yet the performance has an individual quality. And it is unlikely that the separate steps are ever fused into a dance without being thereby changed.

Accompanying this type of skilled action is often an awareness of higher units in the performance. This awareness determines the character of the part-actions before they are executed. It is like the production of accent and stress in speech, song, or music. When the sentence or phrase is initiated, the performer, aware of the whole, determines the parts by means of this awareness.

This patterning acts upon reflexes, instincts, and habits. But often in employing habits it transmutes them into actions less fixed and more adapted to the situation.

### KNACK

Probably a particular type of pattern is the knack of doing certain things. Concerning this Mr. Vivian Caulfeild in his book *How to Ski*,[11]

[11] London, 1924, pp. 10–12.

writes most interestingly. He defines knack as "the ability to perform easily a rapid and accurate coördinated movement of a number of muscles," and continues:

> If this movement is an unaccustomed one, the ability to perform it properly is only attainable by long practice.
>
> The action of throwing, for instance, requires knack. It is this which makes it so difficult to learn to throw with the left hand, even though one already has the ability to move the left arm with quite sufficient strength and speed, and knows not only how the movement should be made, but even *how it feels* to make it with the other hand. Writing is another excellent example of knack.
>
> In ski-running nothing which can strictly be called knack comes into play. In this sport the *voluntary* muscular movements (as distinguished from the involuntary ones used in keeping the balance) are neither complicated nor unusual, and, except in jumping, they need seldom be rapid. Any difficulty in learning them is due partly to the disturbing effect on one's clear-headedness of the speed at which one is travelling, and partly to the fact that some of the movements, though simple in themselves, are almost the reverse of those one's natural instinct would prompt one to make in the circumstances. This difficulty, of course, diminishes with practice, but an effort of will goes just as far as, or even farther than practice towards overcoming it. Were it not for this difficulty, a man who had been told the right way to perform the various manoeuvres employed in skiing might very well do them fairly correctly the first time he tried (as many people actually do), while no amount of strength, activity, intelligence, or confidence would enable him, if right-handed, to throw or write properly with his left hand without long practice.

Knack, then, is the ability to impose a special type of pattern upon one's behavior. The flick and the jerk when performed deliberately and usefully are such patterns. In throwing a ball, a number of muscle-groups must coöperate, simultaneously and successively, *very quickly*. The succession of events which constitute the performance is suddenly quickened up, the leisured semibreves and minims give place to tense semiquavers and demisemiquavers, the wide folds in time ruck into pleats.

### SKILL AND NATURAL APTITUDE

This analysis then, would describe aptitude for a particular form of skill as based upon well-coördinated reflexes, instincts suitable to the task, adapted habits and the power, or maybe powers, of patterning. This power might be partly innate, partly acquired. Its possession in a high degree is a feature of genius in skill.

Of high-grade skill there may be two different types:

(a) Unoriginal. This skill, of course, may reach a very high level of complexity and excellence. It characterizes many industrial processes.

(b) Skill in which there is something personal, new, creative, unique, and difficult or impossible to copy. Such is the skill of a Pachmann, a Kreisler, or a Pavlova. Recently in Paris, legal action was taken against a dancer on the ground that she had disobeyed her contract by inserting into a dance something not agreed upon. A newspaper comment, remarking that Pavlova need never copyright her interpretation of *Le Cygne*, appreciated perfectly this kind of skill. Rhythm is a particularly good example of patterning, and

rhythm in industry may prove to be as important as in music.

### THE INTERFERENCE OF PATTERNS IN SKILL

Connected with this is the interesting fact that clumsiness in a formerly skilled action is sometimes due to the interference caused by learning another pattern, partly similar to the original one, but containing new and antagonistic constituents. Superlative skill might immediately establish the independent status of the two patterns. But usually, unless such a separation be consciously effected, they will mutually interfere.

An example occurs in skiing. To make a certain "Christiania swing" one must lean away from the direction of the turn.[12] While this puzzles many beginners, it offers special difficulty to a figure-skater who may have spent years in perfecting the action of leaning automatically *towards* the turn. Conscious separation and recognition of the two requirements, however, is possible. This may then produce, in a person who skis and skates continually, an integration which comprises both.

This example, which is probably matched in industry, shows that a person who is master of only one movement-pattern, however perfect, in a certain sphere of activity may in one sense be less skilled than another who has a choice of several. Yet the first, because of his excellent expression of that one pattern, may be acclaimed as the more skilled. We might perhaps say that his *intensive* skill is greater, his *extensive* skill less.

And here arises the consideration which complicates the discussion of a related subject, intelligence. May special skills exist in a person alongside a general skill? I have discussed this subject, and researches which bear upon it elsewhere.[13] It is too complicated to be developed here. But we seem justified in believing that though the extensively skilled person may be jack-of-all-trades and master of none, good teaching and intelligent learning might integrate his extensive skill.

### PROPRIA AND ACCIDENTS OF SKILL

(a) *In play.* It is useful to ask if some features of skill are only accidental while others are essential; whether—to borrow terms from logic—skill has its *accidents* and its *propria*.

When discussing fundamental questions of skill with the average English player of games, he often lays almost exclusive stress upon delicate coördination of hand and eye, and upon the timing of complex muscular action to meet a momentary combination of external events. Often such very delicate timing is supremely important, but chiefly in hitting or catching a moving ball. It enters less into many kinds of "postural" skill, and certainly less into industry. For this reason I believe that the scientific investigator of skill should put ball-games late, not early, in his program of study. Seldom does the workman have to catch his material as it whizzes past him, except occasionally in bricklaying. And per-

[12] Caulfield, pp. 178ff.

[13] *Op. cit.*, pp. 22ff.

haps even this picturesque touch is dispensable.

In many skills the emotional factor is an accident. In the trying circumstances of a match a footballer or lawn-tennis player should obviously be able to keep his head. But such coolness may be but indirectly related to his skill. Some play better when keyed up, fearing nerves less than stodginess; some go to pieces at the thought of spectators; others frankly admit the inspiration of a crowd. The expression of skill may be either helped or hindered by emotion.

(b) *In work.* In industry, many skilled actions are performed in unvaried conditions, with little or no emotion. For these two reasons it would not be surprising if the problems of skill in industry proved to be easier than those of skill in sport. In a valuable article on Skill in Industry, Miss Anna Bezanson,[14] of the University of Pennsylvania, writes:

> Considering the glibness with which workmen are pigeon-holed as "skilled," "semi-skilled," and "laborers" in many industries, it is surprising to find little definition of what constitutes skill or lack of skill. Everyone takes it for granted that precisely what he means is understood by referring to a workman as possessed of "skill."

With many illustrations drawn from industry she has collected widely different meanings of accidental factors in skill. We may gratefully utilize her material by quoting some of them, venturing comments from the psychologist's point of view after each one.

[14] Quarterly Journal of Economics, 1921–22, Vol. 36, 626–645.

(1) *Taking responsibility for a large number of independent decisions.* Though the way in which those decisions are made may involve skill, the acceptance of responsibility is due to other factors.

(2) *Learning about the capabilities of materials.* This is the process of acquiring ordinary knowledge. It may be possessed in a high degree by an unskilled person, who can often acquire the knowledge from observation or from books.

(3) *The acquisition of fairly accurate judgment and knowledge concerning apparently outside jobs* often differentiates expert workers from others less capable.

> Frequently the test seems to be outside the actual job. For instance, the best inside lineman's test in the army—that which really differentiated workmen—was an outside wireman's job. The fact is that a really good inside wireman does know something of outside wiring.

In practice this is possibly of great importance. Its significance for theory however is simply that, other things, including intensity, being equal, the greater the extensity of skill the better.

(4) *The ability to transfer knowledge and skill to a different industry and to different material.* This raises in a pleasingly concrete and useful form the vast problem of the relation between general or formal and specific training. More accurately it raises the problem twice, once in the realm of knowledge (including, if it exist, muscular or kinaesthetic knowledge) and once in the realm of skill or power.

In *Skill in Work and Play* (Chap-

ter V), I discussed the bearings of these problems upon the present theme. Since then the question has been treated by Professor G. H. Thomson[15] and Dr. P. B. Ballard.[16] The possible "transfer" of skill is being investigated in the Manchester laboratory by Mr. J. N. Langdon and Miss Edna M. Yates.

The interest of the problem to the theorist and, obviously, its vexatiousness to the practical man in a hurry, lies in the nature of the mental and bodily processes by which such transfer is effected. Are they, in any particular person, habits, behavior-patterns, emotional attitudes, sentiments, ideals, or a uniquely personal blend of these? That an answer to this question is often highly desirable was tragically illustrated when, during the war, men successful in one branch of activity succeeded or dismally failed to "transfer their knowledge and skill to a different industry and to different material." A relatively new and perhaps simplifying factor has recently arisen, as Mr. Arthur Pound has pointed out.[17] The introduction of automatic machinery involving subdivided operations often facilitates such transference. Moreover the machinery may even be designed with this aim in view, i.e., so that the simple operation may form a unit in the production of different articles. So credit for successful transference may be due less to the transferer than to the machine's inventor; an example of the portentous "fractional distillation of skill" of which more will be said in a forthcoming book.

Probably a special instance of this problem is raised in the consideration of

(5) *Keenness of perception.* At first sight it might seem that unusual keenness of perception, which usually means unusually fine sensory discrimination, and unusual skill, are sure to go together. This is a hypothesis, which can and will be experimentally attacked in many investigations. Seashore perhaps led the way in the investigation of musical talent;[18] his example will be followed in many other directions. But while it seems unlikely that superlative skill will be found linked to subnormal discrimination, a high correlation between them cannot be *assumed.*

In this connection, it should not be forgotten that the correlation between sensory discrimination and general intelligence, though usually positive is very low.[19]

(6) *Appreciation of the inter-relation of factory processes.* This asset, though important, might at present be placed rather with problems of intelligence[20] than with those of skill as we have defined them.

## DISTRIBUTED AND CONCENTRATED ATTENTION IN SKILLED PERFORMANCES

In learning a complicated and difficult set of actions, one is struck by a

[15] *Instinct, Intelligence, and Character.* London.

[16] *The Changing School.* London.

[17] *The Iron Man in Industry.* Boston, 1922.

[18] *The Psychology of Musical Talent.* Boston, 1919.

[19] *Psychological Tests of Educable Capacity.* London, 1924.

[20] Spearman, C. E. *The Nature of Intelligence and the Principles of Cognition.* London.

difference between two requisites. The first is the ability to perform a temporal series of connected movements, when at any moment attention is concentrated upon the performance of one movement only. The second is the ability to perform several important actions simultaneously, e.g., at the same moment to move the two legs, the two arms, the head, shoulders, trunk, and hips, in a specified way. Conceivably the capacities underlying these two abilities might have little in common, and psychologists have long distinguished, though perhaps too sharply, between distributed and concentrated attention.

The native endowments and the acquirements of skilled people probably differ in this respect, a point which may usefully be kept in mind while teaching. As a learner I have often noticed my difficulty in distributing attention simultaneously to different parts of the body, as compared with the relatively greater ease of concentrating attention on one part. And so doing I have enviously eyed the lucky ones with great ability, in this sphere of activity, to distribute their attention.

It is possible that many experiments upon skill which employ a maze,[21] through which the subject is required to pass a stylus, or even himself, do not test distributed attention. They may examine only the power to link in serial order a number of conditioned responses. Threading a maze, for example, gives little opportunity to the creators in skill. It may even involve skill of a relatively low order. A fuller appreciation of the many excellent experiments on typewriting[22] would probably result from analytic criticism of this kind.

[21] *Cf.* Thomson, op. cit., Chapter VII. Gopalaswami, M. *Economy in Motor Learning.* British Journal of Psychology, 1924–25, Vol. 15, p. 226.

### WHAT KINDS OF SKILL DOES INDUSTRY WANT?

When we examine the applicability of these considerations to industry it is wise to ask a question. Is skill of the higher type described and exemplified above—and especially, creative or individual skill—possible, necessary, or desirable in this or that particular section of industry?

Without detailed answers to such questions, industrial psychologists will not investigate but grope, and not only they, but economists and others to whom skill and its remuneration are outstanding problems.

Analytical descriptions of the types of skill which are employed in important branches of different industries would be invaluable. Investigations with this aim are in progress in Great Britain under the direction of the Industrial Fatigue Research Board and the National Institute of Industrial Psychology.[23]

### A GENERAL CLASSIFICATION OF INDUSTRIAL SKILLS

Meanwhile, one may profitably attempt to classify industrial skills, be-

[22] Book, W. F. *The Psychology of Skill.* New York, 1925.

[23] *Cf.* articles by Max Tagg and Winifred Spielman in the Journal of the National Institute of Industrial Psychology, 1923, Vol. 1, 277–282, 313–324, 1925, Vol. 2, 256–261, 313–323, and its Report No. 1, on "Occupation Analysis," 1924.

ginning at the lowest type and ending at the highest.

(1) *Responses imperfectly adapted to the situation which evokes them.* This class probably includes a great many forms of domestic service in England. Domestic workers often resist not only new methods but the introduction of labor-saving apparatus such as the vacuum cleaner, the electric iron, etc. At such a level is the skill of many laborers and workers in the semi-skilled trades.

This is not written in ignorance of the fact that apparently simple tasks may be placed higher in the scale of skill by a man who knows them well than by the outside observer. Nasmith,[24] who recognized the demands made upon workmen in moving machinery says,

> The village of Worsley, the headquarters of the Bridgewater Canal, supplied us with a valuable set of workmen. They were, in the first place, laborers; but like all Lancashire men, they were naturally possessed of a quick aptitude for mechanical occupations connected with machinery. Our chief employment of these so-called laborers was in transporting heavy castings and parts of machinery from one place to another. To do this properly required great care and judgment, in order that the parts might not be disturbed, and that the workmen might proceed towards their completion without any unnecessary delay. None but those who have had practical acquaintance with the importance of having skilled laborers to perform these apparently humble but in reality very important functions, can form an adequate idea of the value of such services.

[24] In James Nasmith, *Autobiography*, quoted by Bezanson.

(2) *Responses perfectly adapted to the situation, yet exhibiting nothing personal or self-expressive.* Such is the skill of the perfectly drilled private soldier on parade, where the expression of individuality is obviously not encouraged. If the various routine adjustments in the armies had been motion-studied (a few have) a parallel could be drawn between military skill of this kind and the skill which would result in industry if a stereotyped series of actions, however efficient, were forced upon the worker. The skill would then be like that of a soldier shouldering arms when standing in line. Its advantages and disadvantages are made clear in military organization.

(3) *Responses of the nature of habit, but less mechanical.* They are adapted, yet very susceptible to modification. Such habits do not appear objectively to the outside observer, to be mechanical, nor subjectively to their performer, to be unconscious. They are seen in sports, when rapid, delicate, complex, and effective adjustment is required in relation to the surface upon which the player is moving, e.g., wet and dry, shale and grass, tennis courts; heavy and light football pitches, hard, soft, smooth, and bumpy ice; and different hardnesses and elevations of snow-slopes.

This adaptation may be effected to conditions both external and internal. A person who is feeling ill may modify his performance in such a way as to throw less strain upon his muscles, yet without decreasing control. A light-weight footballer will behave differently towards a wet slippery ground

and one which is hard and dry. A first-class automobile driver's adaptive behavior in traffic makes the ordinary amateur look like the bundle of habits which some pessimists declare man to be.

(4) *Responses like those in 3, but exhibiting in their totality a pattern characteristic of the individual.* This pattern may be unoriginal or original. A style which appears to the spectator to be characteristic may actually have been imparted by a teacher, though to it the pupil often—perhaps usually—adds some personal features.

Types 3 and 4 shade into each other. In 4 an aspect implicit in 3 is shown with particular emphasis. These two types of skill are probably in the minds of writers who object to the standardization of industrial tasks.

(5) *Creative skill; possibly the highest type.* In this realm there may be two kinds of creation. One is unconscious, or nearly so, as when a pioneer claims that his work seems to find its way out of him. Another kind may result from deliberate analysis of earlier attempts, which would be satisfactory to most persons; but are unsatisfactory to the creative genius. Such analysis[25] may involve recall in memory (visual, muscular, and verbal) of various skilled feats, comparison and discrimination between them, selection of their relevant aspects, re-comparison with some aim in view, re-combination, and as a result, an unanalyzed—perhaps unanalyzable—polish which fuses the movements into a dazzling new unity.

This is inventive creation in skill resulting from analysis. It is seen and will be seen oftener in the world of play and art. It may increase in the world of industry, if industry desires and deserves it.

(*Manuscript received December 20, 1926.*)

[25] It may follow the lines of analytic thinking in general. *Cf.* Pear. British Journal of Psychology, 1921, Vol. 11, 72–80.

# Selection of Typists and Stenographers: Information on Available Tests

By Max Freyd, *Personnel Research Federation*

*Of the many requests for information which come to the Personnel Research Federation, a sizable proportion have to do with tests for typists and stenographers. As a matter of economy in answering these inquiries, and in the hope that it would be of use to many others as well, this summary of information on available tests has been undertaken.*

ESSENTIAL information is here presented on every proposed test for typists and stenographers which has been written up. This is not in any sense a critical review of the literature. Few comments will be found on the construction of the tests or the soundness of the validating procedures. The tests are presented for what they are worth. The fact that a test proved worth while as a result of a research study made by a competent investigator has been felt sufficient reason for bringing it to the reader's attention. Some other tests are included which have not been validated but which were constructed by trained men and have possibilities for those who are in a position to use them.

It should be pointed out that some tests have not proved valid under all circumstances. The reader is therefore warned to use the test norms only provisionally, and to establish independently the validity of the test for his own selection problem.

The test to use will depend on a number of factors,—whether one wants to measure proficiency in the duties of a typist or aptitude for learning those duties, whether one wants a convenient and simple test or wants to go more fully into the measurable abilities of the applicant with the aid of a trained personnel worker, etc.

The test researches are reported in three sections, Tests for Typists, Tests for Typists and Stenographers, and Tests for Stenographers. Included among these are proficiency tests, aptitude tests, and educational tests.

Tests which have proved to reveal the abilities of the typist, as shown in studies of experienced typists, are summarized under the following headings: United States Army Trade Test for Typists, Lahy, Bieneman, Link, Viteles, Muscio and Sowton, Rogers, Burt, and Scott Company. The tests which are summarized and which have been evaluated are listed below.

*Involving the use of the typewriter*

Typing from printed copy (Army, Link, Viteles, Burt)

Typing from memory (Burt)
Typing from handwritten copy (Burt)
Tabulating on the typewriter (Burt)
*Other related functions*
Spelling (Link, Muscio and Sowton, Bieneman)
Arithmetic (Viteles)
Filing (Viteles)
Punctuation (Bieneman)
*Physical tests*
Muscular symmetry, tendency of the two hands to be equal in strength (Lahy)
Tactile sensitivity (Lahy)
*Mental tests*
Immediate memory for phrases and sentences (Lahy, Muscio and Sowton, Bieneman)
Substitution, code learning (Link)
Context, sentence completion (Link, Bieneman)
Directions (Muscio and Sowton)
Color naming (Rogers)
Number checking, cancellation (Rogers, Bieneman)
Verb object association (Rogers)
Mental alertness (Scott Company)
Permutations (Bieneman)

Tests of aptitude for learning typewriting are reported under the following headings: Rogers, Gronert, Tuttle, Brewington, Book, and Lough. The tests which have been evaluated are

*Physical tests*
Motor action, speed of tapping a key (Tuttle)
Voluntary muscular control (Book)
Serial reaction (Brewington)
*Mental tests*
Substitution, code learning (Gronert, Tuttle, Lough, Brewington)
Verb object association (Rogers)
Number checking, cancellation (Rogers)
Color naming (Rogers, Brewington)
Action agent association (Rogers)
Attention and accuracy, checking pairs of numbers and letters (Tuttle)

Tests for stenographic ability are given under the following headings: Burt, Scott Company, United States Army Trade Test for Stenographers, Bills, Link, Benge, and Shellow. The tests are

*Involving the use of shorthand and the typewriter*
Taking dictation and typing from notes (Army, Link, Benge, Shellow)
Taking dictation (Burt)
Typing from copy, from memory, from handwritten copy, tabulating (Burt, Shellow)
*Other related functions*
Correcting mistakes in a letter (Bills)
Spelling (Link, Benge)
Grammar (Link)
*Mental tests*
Cancellation (Bills)
Substitution, code learning (Link)
Context, sentence completion (Link)
Mental alertness (Scott Company, Bills, Shellow)

The only tests of aptitude for learning stenography are those reported by Rogers and Ohmann:

*Related functions*
Language (Ohmann)
Spelling (Ohmann)
Vocabulary (Ohmann)
*Physical tests*
Motility (Ohmann)
*Mental tests*
Mental alertness (Ohmann)
Hard directions (Rogers)
Opposites (Rogers)
Form substitution, code learning (Rogers)
Verb object association (Rogers)

Hoke reports several educational tests in stenography.

# I. Tests for Typists

### UNITED STATES ARMY TRADE TEST FOR TYPISTS

#### *References*

C. C. P. Trade Test—Typist. 39-t. Performance. July 30, 1918. Printed by the Trade Test Division of the Committee on Classification of Personnel in the Army.

J. C. Chapman. *Trade Tests.* New York, 1921.

#### *Description of test*

Copy consisting of approximately 300 words describing army organization is given to the typist, with instructions to type it as rapidly as possible with a minimum of mistakes. To obtain the candidate's score the number of errors is added to the number of minutes required (fractional parts of a minute are disregarded) multiplied by ten.

The candidate is rated according to the following table:

*Expert:* 0 to 85 inclusive with not more than 5 errors.
*Journeyman:* 0 to 86 inclusive with more than 5 errors.
*Apprentice:* 87 to 150 inclusive.
*Novice:* 151 and above.

#### *Evaluation*

This test was evaluated on typists of known trade status and ability. For the method of evaluation rather than the exact figures, see Chapman's *Trade Tests.*

#### *Where obtainable*

The test is printed in full with complete directions in Chapman's *Trade Tests* (pages 319–321). Requests for permission to reprint the material should be addressed to the Adjutant General of the United States Army, Washington, D. C.

### LAHY

#### *Reference*

J. M. Lahy. *Les Conditions Psychophysiologiques de l'Aptitude au Travail Dactylographique.* Journal de Physiologie et de Pathologie Generale, 1913, Vol. 15, 826–835.

#### *Description of tests*

This account of Lahy's tests is taken from the summary in Muscio's *Vocational Guidance* (report No. 12 of the Industrial Fatigue Research Board).

Four valid tests for typists are listed, but not adequately described:

*Immediate Memory for Concrete Phrases.*

*Muscular Symmetry* (tendency of the two hands to be identical in strength).

*Tactile Sensitivity.*

*Muscular Sensitivity* (determined by weight-lifting).

#### *Evaluation*

These and several other tests were given to 11 experienced typists. The ability of these typists was judged by having them type a short piece of connected prose and turning their work over to the director of a typewriting office and several other typists for ratings on speed, errors, and arrangement. Muscio made the correlations

between tests and typing ability from Lahy's printed data. The results for the four tests given above were the highest:

| | |
|---|---|
| Immediate Memory | 0.60 |
| Muscular Symmetry | 0.68 |
| Tactile Sensitivity | 0.77 |
| Muscular Sensitivity | 0.58 |

The average rank in the four tests correlates 0.89 with typing ability.

*Where obtainable*

Complete instructions for these tests are not obtainable.

BIENEMAN

*Reference*

Dora Bieneman. *Ability in Typewriting in Relation to Vocational Guidance.* Studies and Reports, Series J (Education), No. 2. Geneva: International Labour Office, 1923.

*Description of tests*

*Spelling.* A continuous printed text without punctuation and with 18 grammatical and spelling mistakes, is given to the subject. He is allowed three minutes to correct the misspelled words and insert punctuation marks. The score is the number of spelling corrections properly made.

*Punctuation.* The score is the number of punctuation marks properly inserted in the above test.

*Memory for Phrases.* The examiner reads sentences varying from 10 to 40 syllables in length, each length being represented by a series of four or five sentences. The subject repeats them one by one. The examiner notes the longest series of which the subject succeeds in repeating at least two sentences correctly.

*Permutations.* The subject is required to write as many permutations as possible of the four letters, *a, b, c, d,* in one minute.

*Cancellation (Quality).* The subject is given a sheet of paper bearing printed squares, each of which has on its outline a short line pointing towards the center and in a different position in each square. The subject has to strike through those squares where the line is in one of four positions given in a sample put before him. The score is the proportion of squares correctly cancelled to the total number to be cancelled.

*Sentence Completion.* The subject has to read sentences in which the vowels are omitted and represented by dots. The examiner notes the time taken and the number of sentences read correctly.

The total score in these six tests is used in the selection of typists. The article does not give complete data for their use.

*Evaluation*

Sixteen tests were given to 28 typists in the French Typewriting Department of the International Labour Office. The typists were ranked on their vocational efficiency by two supervisors, and each test was correlated with each of the two ratings. The average correlation was higher for supervisor B than for supervisor A. The six tests correlating the highest with B's ratings were

| | |
|---|---|
| Spelling | 0.62 |
| Memory for Phrases | 0.62 |
| Permutations | 0.59 |
| Cancellation (Quality) | 0.47 |
| Sentence Completion | 0.44 |
| Punctuation | 0.42 |

The total score in these six tests correlated .84 with B's ratings and 0.67 with A's ratings.

*Where obtainable*

Inquire of the International Labour Office, Geneva, Switzerland. (It is important to note that the tests were devised for French typists.)

LINK

*Reference*

Henry C. Link. *Employment Psychology.* New York, 1919.

*Description of tests*

The series for typists consists of four tests:

*15. Letter Substitution.* The key for this test is as follows:

b l r d n y q
f w h i s a x

The letters in the top row are repeated in chance order in the body of the test, forming 12 columns of 12 letters each. The applicant is required to write under each letter in the body of the test the letter which appears under it in the key. The time limit is 120 seconds. The score is the number of letters completed minus twice the number of errors divided by 90.

*13c. Context Test.* This test consists of 15 sentences in each of which one or more words have been omitted. The applicant is required to supply the missing words. The time limit is 240 seconds. The score is the number of the last blank attempted, minus the number of blanks omitted up to the last one attempted, minus twice the number of errors, divided by 31.

*16. Spelling.* This is a list of 84 words, some of which are misspelled. The applicant is asked to check the misspelled words. He is allowed to finish and the time is recorded. The examiner corrects the test and then dictates the words which have been wrongly checked or overlooked and notes whether the subject repeats his errors. Errors count one if made once, two if repeated. The error score is subtracted from 84, the result is multiplied by 1.5, and this figure is divided by the number of seconds required. The result is the score for the test.

*Test 20T3. Typewriting Test.* This consists of a letter which the applicant is required to copy on a typewriter. The letter has 150 five-space units. The test is scored in terms of time required to complete the letter, number of units covered, and number of mistakes made. Mistakes are graded on a sliding scale. The score is 150 minus the error score divided by the number of seconds taken.

The total score is 0.10 times score in Test 15, plus 0.25 times 13c, plus 0.25 times 16, plus 0.40 times 20T3.

Those scoring from 0.60 to 1.00 are recommended. Those scoring between 0.50 and 0.60 are recommended for a trial under close supervision.

The tests are administered individually and require about 15 minutes.

*Evaluation*

No figures on evaluation are given, although the author states that the tests were tried out on large numbers of applicants and employees and were selected on the basis of their consistent agreement with the abilities of those examined.

*Where obtainable*

The tests and directions are printed in full in the volume referred to above. They are obtainable from C. H. Stoelting Company, 424 North Homan Avenue, Chicago, Ill.

VITELES

*Reference*

M. S. Viteles. *Job Specifications and Diagnostic Tests of Job Competency Designed for the Auditing Division of a Street Railway Company.* Experimental Studies in Psychology and Pedagogy, No. IX. Philadelphia, 1922. (See also the Psychological Clinic, 1922, Vol. 14, 83–105.)

*Description of tests*

There are five tests in the series for selecting typists, none of which is described fully by the author.

*Test F-100 (Arithmetic)* is not described. The time allowed is 6 minutes and the score is the number right. The passing score is 10 or more.

*Tests F-105, F-105C,* and *F-105D* are measures of the applicant's ability to typewrite. "The first is a test of the ability to copy uncorrected material; the second a test of the ability to copy corrected material, and the third a test of the ability to tabulate rough copy. The typing tests are scored in terms of time taken to finish and number of errors. Mistakes in spelling, spacing, and punctuation constitute errors. The standards are such that all applicants may be divided into three classes on the basis of the proficiency of each in this test." The author gives the following tentative classification of typists on the basis of these typewriting tests: Class A, time—6 minutes, 8 errors; Class B, time—8 minutes, 8 errors; Class C, time—about 9 minutes.

*Test F-110* is a filing test and is not described. The time allowed is 3 minutes and the score is the number right. The passing score is 21.

In order to be considered for employment the candidate must receive at least a B classification in the typing tests and a passing score in F-100 and F-110.

*Evaluation*

The tests were evaluated on typists in the auditing division of a street railway company. Passing scores were established by comparing test scores with proficiency ratings made by the division head and supervisor. No figures are given by the author.

*Where obtainable*

Inquire of Dr. M. S. Viteles, Department of Psychology, University of Pennsylvania, Philadelphia, Pa.

MUSCIO AND SOWTON

*References*

B. Muscio and S. C. M. Sowton. *Vocational Tests and Typewriting.* British Journal of Psychology, 1923, Vol. 13, 344–369.

*Three Studies in Vocational Selection.* Industrial Fatigue Research Board, Report No. 16. London, 1922.

*Description of tests*

The following are the three most valid tests discovered in this investigation:

*1. Immediate Memory (Sentences).* This is a test of the ability to repeat a sentence after a brief exposure.

*2. Spelling.* This is Link's spelling test (see page 494).

*3. Directions.* This test resembles Part 1 of Army Alpha. It is a test of the ability to carry out involved directions.

*Evaluation*

A total of 22 tests were given to 11 groups of typists, 220 subjects in all. The members of each group were ranked on their ability by overseers, and these rankings were correlated with test scores. The correlation of any given test with typewriting ability varied considerably from group to group. The tests mentioned above had the highest average correlation with typewriting ability:

| | |
|---|---|
| *1. Immediate Memory (Sentences).* | 0.43 |
| *2. Spelling.* | 0.40 |
| *3. Directions.* | 0.34 |

*Where obtainable*

The first and third tests are printed in full in the report of the Industrial Fatigue Research Board referred to above (pages 15–17). The spelling test is printed in full in Link's *Employment Psychology*, pages 415–416.

ROGERS

*References*

Herbert W. Rogers. *Some Empirical Tests in Vocational Selection.* Archives of Psychology, No. 49, 1922. New York, 1922.

R. S. Woodworth and F. L. Wells. *Association Tests.* Psychological Monographs, No. 57, 1911. Princeton, 1911.

*Description of tests*

Two series of tests are described, one for the prediction of educability in typing, and the other for the detection of proficiency in typing. All the tests are from the Woodworth and Wells series.

The educability tests are as follows:

*Verb Object.* The subject is required to give the object of each of a series of verbs.

*Number Checking.* The subject crosses out certain numbers in a page of digits arranged in groups of 6 and in chance order.

*Color Naming.* The subject is required to name as rapidly as possible the color in each of a series of squares. Five colors are represented, and the squares are arranged in chance order.

*Action Agent.* The subject is required to give the agent corresponding to each of a series of words representing an action.

The proficiency tests are *Color Naming*, *Number Checking*, and *Verb Object.*

*Evaluation*

The educability tests were evaluated as follows: The subjects were 45 students of stenography, typing, and grammar, in a course in the Columbia University Extension Department, lasting from October, 1915, to May, 1916. Nine different Woodworth and Wells tests were given during the first two months of the course, and were correlated with monthly records of performance in typing. The tests described were the most valid. They correlated as follows with average ability for October, November, December, and February:

| | |
|---|---|
| Verb Object | 0.46 |
| Number Checking | 0.45 |
| Color Naming | 0.40 |
| Action Agent | 0.39 |

The multiple correlation coefficient of these four tests with typing ability as thus measured is 0.61.

The proficiency tests were evaluated on typists employed by a large retail firm with headquarters in New York City. One group of 65 subjects had been in the same division from one and a half to six months. A second group of 38 subjects had been in a given division for at least 10 months. The measure of proficiency was the average number of sheets typed per day. The work of these typists was practically all of the same sort.

Correlations of tests with proficiency are given below:

| | FIRST GROUP—FIFTH AND SIXTH WEEK | SECOND GROUP—FIVE WEEKS AVERAGE |
|---|---|---|
| Color Naming | 0.36 | 0.39 |
| Number Checking | 0.34 | 0.28 |
| Verb Object | 0.33 | 0.28 |

*Where obtainable*

The Woodworth and Wells association tests are obtainable from C. H. Stoelting Company, 424 North Homan Avenue, Chicago, Ill.

GRONERT

*References*

Mary Lynch Gronert. *A Prognostic Test in Typewriting.* Journal of Educational Psychology, 1925, Vol. 16, 182–185.

Mabel Easterbrook and Minnie A. Vavra. *Factors Predetermining Success in Typewriting.* Public School Messenger (St. Louis, Mo.), May, 1924.

*Description of test*

The *Lynch Prognosis Test* is of the letter-figure substitution type. The key, which is printed at the head of the test, is as follows:

A M Y U S X Z
1 2 3 4 5 6 7

The body of the test consists of these letters in chance order arranged in 10 rows of 10 each. The subject is asked to place the appropriate figure below each letter as rapidly as possible. Three trials are given at intervals of 6 days and 4 days. In the first trial the time limit is 1½ minutes, in the second 1¼ minutes, and in the third 1 minute. In each case the score is the number of correct substitutions.

The author does not say which score to use, or if an average is used. She gives the following medians for the three trials: 62.5, 61.1, and 60. She advises the selection of all making scores of 50 or more.

The test may be given individually or to a group. In the study reported, as many as thirty persons were tested at one time.

*Evaluation*

The test was given to students of typewriting in St. Louis high schools, and scores were compared with the course grades given by the teachers. These grades, from highest to lowest, are: E, G, M, P, and F.

One group of 130 students were graded by the same teacher who gave the tests. The optimum critical score

was found to be 50. Of 91 students making 50 or more in the test, 24 were graded E and 3 were graded F. Of 39 students making less than 50, none were graded E and 20 were graded F.

Comparable results were obtianed with another group of 28 pupils who were tested by a teacher other than the one who graded them.

Easterbrook and Vavra evaluated the test in the same way. They gave it to 181 pupils in a course in typewriting in a St. Louis high school and compared scores with grades for the term. The test was given three times (on consecutive days) with a time limit of 2 minutes. The score for each trial was the number completed minus 5 points or each error. The average score for the three trials was used. This average score correlated only 0.25 with course grades. The process was repeated with another group of 151 pupils, using a time limit of 1½ minutes, and the correlation was raised to 0.48. The authors use a critical score of 60. In the second group, of 77 pupils making 60 or more in the test, 27 were graded E and 10 were graded F; of 74 making less than 60, 7 were graded E and 31 F.

*Where obtainable*

The test is not available. It is printed in full with directions in the Public School Messenger for May, 1924.

TUTTLE

*Reference*

W. W. Tuttle. *The Determination of Ability for Learning Typewriting.* Journal of Educational Psychology, 1923, Vol. 14, 177–181.

*Description of tests*

*Motor Action Test.* This test consists of tapping any key on the keyboard of a typewriter with any finger, as rapidly as possible. The number of taps made is shown on the carriage scale. The subject is given 5 trials of 5 seconds each with each hand. The score is the average number of taps made per 5 second trial. This is a poorly standardized test, since the score will depend on the typewriter used, the key struck, the condition of the machine, and the finger used.

*Attention and Accuracy Test.* This test has two parts. Part 1 consists of 9 horizontal lines of 61 figures each, in which occur 100 combinations of too consecutive figures whose sum is 9. The subject is required to underline all such combinations. The time limit is 5 minutes, and one point is given for each correct underlining. Part 2 consists of 11 horizontal lines of 57 letters each, in which the letters $x$ and $n$ are contiguous 100 times. The subject is required to underline all such combinations of $x$ and $n$. The time limit is 3 minutes and the score is the number of correct underlinings.

*Substitution Test.* The subject is given two cards. One is a key card and contains a digit and a symbol, as, 1 (, 2 ?, 3 ✱, etc. The other card contains the symbols only, arranged in chance order in 25 lines of 4 each. The subject is required to write on this card the figure corresponding to each symbol, using the key card as a guide. The time limit is 5 minutes, and 4 points are given for each correct line.

The total score is the sum of the scores made in these tests.

According to the author, those getting a total score of 80 or more will probably become excellent typists, those scoring from 75 to 79 will probably become average typists, and those scoring less than 75 will probably become poor typists.

*Evaluation*

Six tests were tried out on 20 students beginning the study of typewriting. These test scores were later correlated with a test of typewriting ability. The three tests described above gave the highest correlations:

| | |
|---|---|
| Motor Action Test | 0.54 |
| Attention and Accuracy Test | |
| Part 1 | 0.41 |
| Part 2 | 0.68 |
| Substitution Test | 0.52 |

The total score for these three tests correlated 0.62 with typewriting ability. (No multiple correlations were figured.)

*Where obtainable*

Inquire of Prof. W. W. Tuttle, Room 240, Medical Laboratory, University of Iowa, Iowa City, Iowa.

BREWINGTON

*Reference*

Ann Brewington. *Prognostic Tests for Typewriting.* American Shorthand Teacher, 1923, Vol. 4, 1–5, 50–55.

*Description of tests*

Three tests are described which the author believes valid and practicable for predicting ability in a typewriting course.

*Serial Typewriting Reaction Test.* This test was constructed to measure the rapidity and the degree of accuracy with which the subjects could react to the appearance of a series of numbers by pressing the keys with the fingers designated by those numbers. The numbers appeared in sequence through a slit in a screen on the top of the typewriter. As soon as one key was pressed the next number appeared. An ordinary typewriter, with certain attachments, was used for this test. The apparatus is described in the above reference.

*Color Naming.* The subject is required to name as rapidly as possible the color in each of a series of squares. Five colors are represented, and the squares are arranged in chance order.

*Form Substitution.* This is a measure of the ability to learn a code. The key consists of five figures (1 to 5) placed inside five different sorts of geometrical forms. The test sheet has several lines of these forms in chance order, and the instructions are to place the appropriate figure inside each form.

No figures are given in this article which may be used in applying the tests.

*Evaluation*

These tests, as well as several others of the Woodworth and Wells series, and a typewriting rhythm test, were evaluated on two groups of students of typewriting, 20 at the University of Chicago and 22 at a business college in Chicago. The tests were given before instruction commenced and scores were correlated with various records of actual class work. The above tests proved to be the most valid. The

average correlations of these tests with class work records of various sorts are as follows:

| | *Group 1* | *Group 2* |
|---|---|---|
| Serial Reaction | 0.67 | 0.69 |
| Color Naming | 0.33 | 0.42 |
| Form Substitution | 0.15 | 0.29 |

*Where obtainable*

The Color Naming and Form Substitution tests are obtainable of C. H. Stoelting Company, 424 North Homan Avenue, Chicago, Ill. For information on the Serial Reaction Test, inquire of Ann Brewington, University of Chicago, Chicago, Ill.

BOOK

*References*

Wm. F. Book. *Voluntary Motor Ability of the World's Champion Typists.* Journal of Applied Psychology, 1924, Vol. 8, 283–308.

W. L. Bryan. *On the Development of Voluntary Motor Ability.* American Journal of Psychology, 1892, Vol. 5, 1–80.

*Description of tests*

Four measures of voluntary muscular control are taken for each arm and hand.

(*a*) The rate per second at which the forefinger can be moved.

(*b*) The rate at which the hand can be moved, using the wrist as a hinge.

(*c*) The rate and regularity with which the forearm from the elbow joint can be moved, not moving the wrist.

(*d*) The rate at which the upper arm can be moved, using the muscles of the shoulder and upper arm.

No total score is used.

*Evaluation*

The tests were given to the contestants (48 cases) in the International Typewriting Contest in 1923, to 5 ex-world champions, and to 65 students studying typewriting at Indiana University.

It was found that the world champion typists at that time excelled all others, including the ex-world champions, the motor ability tests. Among the contestants, the professional excelled the amateurs, and the amateurs excelled the novices, etc. This held for each of the eight measurements taken.

Among the University students, the tests showed a general agreement with teachers' rankings on ability to learn typewriting and semester grades.

*Where obtainable*

Directions for these tests are given in the article by Bryan referred to above.

LOUGH

*Reference*

J. E. Lough. *Experimental Psychology in Vocational Guidance.* Proceedings of the National Conference on Vocational Guidance, 1912.

*Description of test*

The test consisted in substituting one letter for another according to a key or code. The discussion of the test and results is incomplete and only suggestive.

*Evaluation*

The test was given to a number of boys studying commercial subjects in

New York high schools. Merit in the test was determined by ability to improve in a number of performances of the test. Test records were compared with teachers' ratings in courses in typewriting and "business forms" (including stenography). The correlations were computed by Muscio from Lough's printed data. Test records correlated 0.92 with typewriting and 0.75 with business forms.

*Where obtainable*

Inquire of Prof. J. E. Lough, New York University, New York City.

BLACKSTONE

*Reference*

E. G. Blackstone. *Measurement of Progress in Typewriting.* Detroit Journal of Education, 1921, Vol. 1, 35–41.

*Description of test*

*Blackstone Stenographic Proficiency Tests. Typewriting Test.* The typewriting test has five equivalent forms, each of which consists of a business letter of about 200 words to be copied on the typewriter by the person tested. The time limit is three minutes. The score is in terms of point scores based upon a rate and accuracy formula. The author gives norms for various hours of instruction.

*Evaluation*

This test has been evaluated by comparing scores with amount of training in typewriting. Scores have also been compared with success ratings of commercial typists (unpublished).

*Where obtainable*

The test is published by the World Book Company, Yonkers-on-Hudson, N. Y.

THURSTONE

*Reference*

None.

*Description of test*

The Thurstone Examination in Typing consists of three parts. In Part 1 the typist copies a short manuscript containing many author's corrections. Part 2 requires the tabulation of business information. Part 3 is a spelling test. The score is in terms of speed and accuracy. The author gives norms in this test but does not describe the group to which it was given.

*Evaluation*

This test has not been evaluated.

*Where obtainable*

The test may be purchased of the World Book Company, Yonkers-on-Hudson, N. Y.

## II. Tests for Typists and Stenographers

BURT

*Reference*

Cyril Burt. *Tests for Clerical Occupations.* Journal of the National Institute of Industrial Psychology, 1922, Vol. 1, 23–27, 79–81.

*Description of tests*

The author used 16 tests of intelligence, shorthand ability, and typing ability. The tests are very briefly described in the above reference.

The intelligence tests are synonyms

and antonyms, analogies, disarranged sentences, sentence completion, spelling, arithmetic, supplying synonyms for given words, and defining given words.

There were two shorthand tests, one which measured speed at which dictation could be taken, and one which measured accuracy with which unfamiliar words could be taken.

The typing tests included typing from memory, typing from copy, typing from corrected copy, arrangement on page, tabulating, and copying from illegible handwriting.

The author gives critical scores in each of these tests for the selection of stenographers.

*Evaluation*

All these tests were given to 30 stenographers employed in an Education Authority office. These stenographers were ranked by their supervisor in order of (1) general office efficiency, (2) efficiency in typing, and (3) efficiency in shorthand. The intelligence tests correlated 0.79 with general office efficiency, the shorthand tests 0.79 with shorthand ability, and the typing tests 0.60 with typing ability. The author says that "data since obtained from other groups yield results which, so far as they go, confirm the conclusions here reported."

*Where obtainable*

These tests may be obtained of the National Institute of Industrial Psychology, 329 High Holborn, W. C. 1, London, England.

SCOTT COMPANY

*Reference*

A. W. Kornhauser. *Some Business Applications of a Mental Alertness Test.* Journal of Personnel Research, 1922, Vol. 1, 103–121.

*Description of test*

The test in question is the Scott Company mental alertness test. It is similar in principle and operation to the Army intelligence test. There are six parts, each containing 10 to 25 items, and each part is timed separately.

Part 1 contains a series of arithmetical problems. In Part 2 the person tested is to underline the one of four words that is opposite in meaning to a given word. In Part 3 a line is to be drawn under the one of four words in parentheses which is related to the third word in the same way that the second word is related to the first (analogies test). In Part 4 the subject counts the number of blocks in an outline diagram. Part 5 requires the person tested to rearrange a given number of letters to form a word. Part 6 requires the solution of problems of combining coins.

The entire examination takes less than 20 minutes. It is scored in a few minutes by means of stencils. Only a total score is used.

The author gives the following averages and critical scores:

| | AVERAGE | CRITICAL SCORE |
|---|---|---|
| Men stenographers | 59 | 40 |
| Women stenographers | 45 | 33 |
| Women typists | 44 | 30 |

He says further that no one should be favorably considered for employment who scores below the critical score for his occupation and sex unless he has compensating qualifications.

*Evaluation*

No figures on evaluation are given. The standards are based on the research experience of the Scott Company.

*Where obtainable*

The test is reproduced in full in the above reference. It may be obtained of C. H. Stoelting Company, 424 North Homan Avenue, Chicago, Ill.

CODY

*Reference*

Sherwin Cody. *Commercial Tests and How to Use Them.* Yonkers-on-Hudson, 1919. pp. 152 ff.

*Description of tests*

This volume gives some standardized tests for stenographers and typists, consisting of letters and other material to type from copy or from shorthand notes. The average transcription rate for experienced stenographers is given as 40 words a minute, 2¼ errors to each 100 words. High School graduates are able to do 30 words a minute with 5 errors to each 100 words. For copying records the averages are 5 words higher per minute.

*Evaluation*

No figures on evaluation are given.

*Where obtainable*

All the test material is printed in the book. It may be obtained of the National Associated Schools of Scientific Business, Inc., Chicago, Ill.

WOODRUFF

*Reference*

Wm. H. Woodruff. *Standardized Stenographic Tests.* Journal of Personnel Research, 1923, Vol. 1, 562–567.

*Description of tests*

These tests consist of a series of five letters to be dictated to the stenographer at a fixed rate and transcribed from her shorthand notes. The tests may be used for typists also, in which case the letters are typed from printed copy. There are no norms.

*Evaluation*

These tests have not been evaluated.

*Where obtainable*

The letters are printed in full in the above article.

## III. Tests for Stenographers

UNITED STATES ARMY TRADE TEST FOR STENOGRAPHERS

*References*

C. C. P. Trade Test—Stenographer. 39-s. Performance. August 9, 1918. Printed by the Trade Test Division of the Committee on Classification of Personnel in the Army.

J. C. Chapman. *Trade Tests.* New York, 1921.

*Description of test*

A sheet containing two paragraphs (approximately 400 words) of abstract material on ambition is handed to the candidate with instructions to copy it in shorthand as rapidly as he can. The time is recorded in minutes, fractional parts of a minute being disregarded. The candidate is then required to type this material from his shorthand notes as rapidly as possible. This time is also recorded in minutes, fractional parts of a minute being disregarded. The two time scores are added and the sum is multiplied by ten; the number of errors is added to this to obtain the candidate's final score.

The candidate is rated according to the following table:

*Expert:* Score 0 to 225 inclusive with less than 13 errors.

*Journeyman:* Score 0 to 225 inclusive with more than 12 errors and less than 26 errors, *or* score 226 to 300 inclusive with less than 26 errors.

*Apprentice:* Score 0 to 300 inclusive with more than 25 errors, *or* score 301 to 500.

*Novice:* Score 501 or more.

*Evaluation*

This test was evaluated on stenographers of known trade status and ability. For the method of evaluation rather than the exact figures, see Chapman's *Trade Tests.*

*Where obtainable*

The test is printed in full with complete directions in Chapman's *Trade Tests* (pages 322–324). Requests for permission to reprint the material should be addressed to the Adjutant General of the United States Army, Washington, D. C.

BILLS

*References*

Marion A. Bills. *Methods for the Selection of Comptometer Operators and Stenographers.* Journal of Applied Psychology, 1921, Vol. 5, 275–283.

Marion A. Bills. *A Test for the Selection of Stenographers.* Journal of Applied Psychology, 1921, Vol. 5, 373–377.

*Description of tests*

*Bureau of Personnel Research, Test VI.* This test consists of 184 items selected from six of the parts of the Army Alpha Intelligence Examination, namely, arithmetical problems, synonym-antonym, disarranged sentences, number series completion, analogies, and information. Directions for the six types of items are assembled at the beginning of the test. In the body of the test the items are arranged in order of difficulty, each type of item occurring at regular intervals, in the form known as *spiral omnibus.* This test is easier to administer than Army Alpha, and requires less time. The test may be given individually or to a group. Four minutes are allowed for reading directions and fifteen minutes for working on the items. The items are scored just as in Army Alpha, but only the total score is used.

The author recommends hiring only stenographers who score 60 or more in this test.

*Bureau of Personnel Research, Test 8.* This test has five parts, of which only Parts I and V proved useful in selecting stenographers.

Part 1 consists of a printed letter

in which there are a number of mistakes. The subject is required to go over the letter and correct the mistakes in pencil or ink. The time limit is 3½ minutes. The score is the number of proper corrections made.

Part V contains a list of 36 fairly long words, and 13 groups of letters, each group containing 30 letters. The first group contains 30 A's, the second 30 B's, and so on for the 13 letters found in the list of words. The directions are as follows: "For every letter of each of the words below, cross out the same letter in the proper one of the groups of letters at the bottom of the page." Five minutes of working time are allowed, and the score is the total number of letters crossed out.

The author concludes that the chances of success in stenography are practically certain for those who score 100 or more in Part I and at the same time score 130 or more in Part V. The expectation of failure is comparatively high among those who score less than 80 in Part I and at the same time score less than 140 in Part V.

*Evaluation*

Test VI was given to students of stenography in a technical night school which is in close connection with a large manufacturing firm. Practically all of the teachers held positions in the firm and were therefore well able to judge the quality of work that would be acceptable in the business world. A student was considered a success if her teachers recommended that she continue her work, and a failure if her teachers recommended that she take up some other course or type of work.

Of 82 girls tested, 25 were rated as failures. A critical score of 50 in test VI would have eliminated 1 success and 11 failures, and would have accepted 81 successes and 14 failures. A revision of ratings by the teachers on success and failure five months later raised the critical score to 60. This score would have eliminated 18 failures and 1 success, and selected 9 failures and 39 successes.

Test 8 was given to the same group of students as Test VI. Of 80 students tested, 22 were rated as failures. The normal expectation of success is thus 72½ per cent. Of 28 students scoring 100 or more in Part I and at the same time 130 or more in Part V, all were successes. Of 20 students scoring less than 80 in Part I, and at the same time less than 140 in Part V, only 35 per cent were successes.

Test VI was also given to three groups of professional stenographers. One group of 20 was rated on their value to the firm by an executive who was in close contact with all of them. The correlation between test scores and ratings was 0.75. Only one girl scored below 60 in the test, and she was rated lowest by the executive.

In another firm the test was given to 15 stenographers. Of these, 8 were classed as "good," 4 as "getting by," and 3 as "failures," by an executive who knew them all. The respective group averages in test scores were good—110, getting by—65, and failing—63. Only two girls scored below 60, one being rated as getting by and the other as a failure.

The third group consisted of 14 high grade stenographers in 5 different

companies. The lowest score was 109, and the mean score was 153.

*Where obtainable*

Test VI is obtainable from Dr. C. S. Yoakum, University of Michigan, Ann Arbor, Mich.

For information on Test 8, inquire of Personnel Research Federation, 40 West Fortieth St., New York City.

LINK

*Reference*

Henry C. Link. *Employment Psychology*. New York, 1919.

*Description of tests*

The series for stenographers consists of five tests:

*15m. Mixed Letter and Number Substitution.* This test is like Test 15 in Link's series for typists except that it is based on the following key:

| | | | | | | |
|---|---|---|---|---|---|---|
| m | k | 8 | 7 | d | 2 | h |
| c | 4 | 6 | u | y | 9 | t |

*16. Spelling.* For a description of this test see Link's series for typists.

*13c. Context Test.* For a description of this test see Link's series for typists.

*21. Grammar Test.* This test consists of 10 sentences containing grammatical errors which the subject is asked to correct. The maximum time allowed is 180 seconds. The number of mistakes is doubled and subtracted from 40, and the remainder is multiplied by 4. This is divided by the number of seconds taken in order to obtain the score for the test.

*20T3. Stenographic Test.* This is the same as the test of the same number in Link's series for typists. In this case the applicant takes the letter in shorthand from dictation and then types it from her notes. To obtain the score for the test the error score is subtracted from 150 and the result is multiplied by 2.4 and divided by the number of seconds required for dictation and transcription.

To obtain the total score, the scores for the separate tests are weighted as follows:

| | | |
|---|---|---|
| 15m | x | 0.10 |
| 16 | x | 0.15 |
| 13c | x | 0.15 |
| 21 | x | 0.10 |
| 20T3 | x | 0.50 |

All those scoring above 0.60 are recommended. Those scoring between 0.50 and 0.60 are recommended for a trial under close supervision.

These tests are given individually and require about 25 minutes.

*Evaluation*

No figures on evaluation are given, although the author states that the tests were tried out on large numbers of applicants and employees and were selected on the basis of their consistent agreement with the abilities of those examined.

*Where obtainable*

The tests and directions are printed in full in the volume referred to above. They are obtainable from C. H. Stoelting Company, 424 North Homan Avenue, Chicago, Ill.

BENGE

*Reference*

E. J. Benge. *Gauging Stenographic Ability*. Administration, February, 1923.

*Description of tests*

"1. *Dictation.* A letter of several hundred words in length is dictated to the applicant at the maximum rate he can take it. The time required is noted in seconds.

"2. *Transcription rate.* The time required by the candidate to transcribe his notes is also recorded in seconds.

"3. *Transcription accuracy.* This is a percentage figure, obtained by dividing the number of words transcribed correctly by the number of words in the letter. In practice the number of errors only need be recorded.

"4. *Spelling.* The candidate is given a list of 50 words, half of which are spelled correctly and half incorrectly. He is asked to check those which are misspelled. The number of errors only need be recorded. The words used in this test are selected from a survey of thousands of words used in business which are frequently misspelled."

To obtain the applicant's total score, one adds together the number of dictated words taken per minute, the number transcribed per minute, the percentage of the total transcribed correctly, and the percentage of the special list of 50 words checked correctly.

The test requires about 7 minutes of the examiner's time to administer and to score, and about 15 minutes of the applicant's time to perform. It may be given individually or as a group test.

In one company Benge found that in order to insure success the stenographer should score at least 300 points in the test.

A table of percentile values is included in the Instruction Manual, based on 515 cases.

Percentiles are also given for total scores in which dictation is omitted, so that the test may be used for typists only.

*Evaluation*

In one company this test was given to 145 applicants, of whom 24 were hired, using the test as one of the factors in selection. Of these 24 stenographers, 9 were rated by supervisors as excellent workers, 12 as satisfactory workers, and 3 as failures. If the critical score had been set at 300, 67 per cent of the successes, 75 per cent of the satisfactory workers, and none of the failures would have been selected. The rank order correlation of ratings with total test score was 0.44.

The test was also given to 15 stenographers in the employ of another firm. These stenographers were rated on their ability by six executives. The correlation between total test score and pooled ratings on ability was 0.89.

*Where obtainable*

The tests are obtainable from the StenoGaugE Company, 3136 North 24th St., Philadelphia, Pa.

SHELLOW

*Reference*

Sadie Myers Shellow. *An Intelligence Test for Stenographers.* Journal of Personnel Research, 1926, Vol. 5, 306–308.

*Description of tests*

The author used a trade test and an intelligence test.

The intelligence test is described as incorporating the general principles which have been repeatedly used in mental alertness tests, but with subject matter which is germane to the problems with which stenographers must deal. Its separate parts are called Sentence Completion, Tabulation, Syllabizing, Spelling, Abbreviation, Paragraphing, Judgment, Analogies, Proverbs, Sentence Correction, and Grammar Rules. The test may be given individually or to a group, but individual time records for the test as a whole must be kept. The author reports time ranges from twenty-three minutes to forty-four minutes. The test is self-administering, i.e., all instructions necessary to carry out the tasks are given on the blank.

The trade test consists of a rough draft to be correctly typed, dictation of two business letters to be transcribed, and a paragraph of miscellaneous items to be arranged in tabulated form and typed under proper headings.

Critical scores have been worked out for these tests, but have not been published.

*Evaluation*

Twenty-four stenographers in the employ of the Milwaukee Electric Railway and Light Company served as subjects. The criterion of success was a ranking by an examiner who knew their work at first hand and who took into account salary earned, difficulty of work handled, and opinions of department heads. This ranking correlated 0.73 with intelligence test scores and 0.48 with trade test scores. The multiple correlation coefficient of rankings with a combination of intelligence test scores and trade test scores was 0.83.

*Where obtainable*

Inquire of Dr. Sadie Myers Shellow, Milwaukee Electric Railway and Light Company, Milwaukee, Wis.

ROGERS

*References*

Herbert W. Rogers. *Some Empirical Tests in Vocational Selection.* Archives of Psychology, No. 49, 1922. New York, 1922.

R. S. Woodworth and F. L. Wells. *Association Tests.* Psychological Monographs, No. 57, 1911. Princeton, 1911.

*Description of tests*

The tests in this series were evaluated for predicting educability in stenography. All the tests are from the Woodworth and Wells series.

*Hard Directions.* This is a measure of the ability to carry out complicated directions.

*Opposites.* The subject is required to give the opposite of each word in a list of stimulus words.

*Form Substitution.* This is a measure of the ability to learn a code. The key consists of five figures (1 to 5) placed inside five different sorts of geometrical forms. The test sheet has several lines of these forms in chance order, and the instructions are to place the appropriate figure inside each form.

*Verb Object.* The subject is re-

quired to give the object of each of a series of verbs.

*Evaluation*

Nine different Woodworth and Wells tests were given to a group of 45 students of stenography, typing, and grammar, in a course in the Columbia University Extension Department, lasting from October, 1915, to May, 1916. The tests were given during the first two months of the course, and were correlated with performance in the mid-year examination in stenography. The tests in the above list gave the highest correlations:

| | |
|---|---|
| Hard Directions | 0.46 |
| Opposites | 0.45 |
| Form Substitution | 0.40 |
| Verb Object | 0.36 |

*Where obtainable*

The Woodworth and Wells association tests are obtainable from C. H. Stoelting Company, 424 North Homan Avenue, Chicago, Ill.

OHMANN

*Reference*

O. A. Ohmann. *The Measurement of Capacity for Skill in Stenography.* In Psychological Monographs, No. 168, 1926. Princeton, 1926. Pp. 54–70.

*Description of tests*

Five tests are included in the series:

*Motility.* Making marks in groups of three in the squares of a cross-ruled sheet of paper.

*Language.* Checking errors in grammar, punctuation, spelling, and arrangement, in a mimeographed business letter.

*Vocabulary.* A form developed by Vasey and consisting of 100 words selected systematically from a dictionary.

*Otis Self-Administering Intelligence Test.*

*Spelling.* Consisting of 50 words selected from Horn's list of the 200 most misspelled words in business correspondence.

A weighted total score is used. A more detailed description of the tests and the correct weightings to be used are given in the above reference.

*Evaluation*

Nine tests were given to 225 pupils ranging from the second to the sixth semester in a course of training for stenography. Achievement in stenography was measured in a practical way by requiring the pupils to take letters in shorthand and transcribe their notes, and scoring their performance objectively. The five tests mentioned above gave the highest correlations with stenographic ability as thus measured.

| | |
|---|---|
| Motility | −0.32 |
| Language | 0.37 |
| Vocabulary | 0.25 |
| Otis | 0.26 |
| Spelling | 0.41 |

The multiple correlation of this series of tests with stenographic ability is 0.61.

*Where obtainable*

Inquire of Dr. O. A. Ohmann, Cleveland College of Western Reserve University, Cleveland, Ohio.

HOKE

*Reference*

E. R. Hoke. *The Measurement of Achievement in Shorthand.* Johns Hopkins University Studies in Education, No. 6, 1922. Baltimore, 1922.

*Description of tests*

These tests are intended for measurement of classroom achievement in shorthand, rather than for use in selecting stenographers.

*A-1. Reading Ability.* This test consists of a letter printed in shorthand, with every tenth word printed in type and paired with a wrong word. The subject is required to read through the letter, checking the word in each pair which best fits into the context of the letter. The time limit is three minutes, and the score is the number right minus twice the number wrong. This score may be transmuted into a score representing the number of words read correctly per minute.

*B-1. Speed of Writing.* An article of 400 words is printed in type interlined with the same material in shorthand and a blank space. The subject is required to copy the shorthand as quickly as possible in the blank space. The time limit is two minutes, and the score is the number of words per minute.

*C-1. Vocabulary.* The subject is required to write the shorthand equivalents of 150 words and phrases. The subject is allowed to finish.

*Measuring Scale for Shorthand Penmanship.* This scale consists of 16 specimens of shorthand writing of graded excellence, to be used as standards of comparison in judging the penmanship of students.

Some norms are given by the author, but the tests have not been compared with ability on the job.

*Evaluation*

Test A-1 was given twice at intervals of one week to a group of 41 high school commercial students. The self-correlation was 0.80. The average of the two trials correlated 0.55 with a rough and ready test of speed in reading shorthand.

Test B-1 was evaluated by requiring 34 pupils to copy familiar printed shorthand material from a textbook as rapidly as possible for three minutes. The amount copied correlated 0.51 with Test B-1. In a similar experiment with 96 pupils the correlation of reading ability with the average score in two forms of B-1 was 0.73. The self-correlation of B-1 was found to be 0.83 and 0.87 with two groups.

Test C-1 was given to students who had had various amounts of training in shorthand. The median per cent of correct responses for those with one year of instruction was 74, one and a half years, 81, and two years, 78.

*Where obtainable*

These tests may be obtained from the Gregg Publishing Company, 20 West 47th St., New York City.

(*Manuscript received February 19, 1927.*)

# Intelligence of Policemen

By Maud A. Merrill, *Stanford University*

*It is an unfortunate fact that policemen in our large cities rate surprisingly low in general intelligence tests. In explaining this it has been assumed that the work does not attract a more intelligent type of applicant. Dr. Merrill's study throws another light on the matter—the importance of well-advised supervision. In Palo Alto a young, energetic, alert chief of police has been able to hold men on patrol duty whose average intelligence test score is higher than that of army officers and freshmen at many colleges.*

The 113 applicants for positions on the police force of Palo Alto, California, from July, 1924, to July, 1926, averaged 104.2 in Army Alpha. Only 33 per cent were drawn from occupations which are rated lower than policeman from the standpoint of the intelligence level required for success, while 57 per cent were from occupations rated higher.

Thirty of the applicants were given appointments. Preference was given to men who obtained high Alpha scores and who made a favorable impression in a personal interview. Of the men selected, 12 were subsequently discharged, 4 left voluntarily, and 14 survived. Compared with the total number given appointments, those who survived averaged slightly higher in schooling (10.4 years) and in Alpha scores (143.5), and those who were discharged slightly lower in schooling (8.5 years) and practically the same in Alpha scores (137.0). Those who left voluntarily averaged 1.5 years in college and 171.5 in Alpha.

The policeman's job in this community attracts an intelligent type of man, considerably above the average of policemen in large cities. There nevertheless appears to be an upper limit of intelligence for stability at this job.

IN JULY, 1924, a reorganization of the Palo Alto, California, police department was undertaken. At the request of Chief Zink the Psychology Department of Stanford University conducted a series of intelligence tests to assist in the selection of suitable candidates for the force, which consists of fifteen men. Preliminary selections were made on the basis of Alpha scores; and subjective evaluations of personality, appearance, and previous experience were employed to make the final selection. The present paper deals with the intelligence and occupational levels of men who have been applicants during the past two years, and with the relation of intelligence level to success and permanence on the police force.

### INTELLIGENCE LEVEL OF POLICE APPLICANTS

During the two year period which this report covers, 113 applicants have been examined. The scores of applicants range from 13 to 195 on forms 5 and 7 of Army Alpha. Form 5 was given first, followed after a ten minute intermission by form 7. The mean score of applicants on the first test, form 5, was 104.2 (C+), P.E. 27.8. On the second test, form 7, the mean score was 117.1 (B), P.E. 25.5.[1] The middle 50 per cent of the scores on the first test fall between 75 and 136, while on the second test they fall between 91 and 145. The distribution of scores is shown in figure 1.

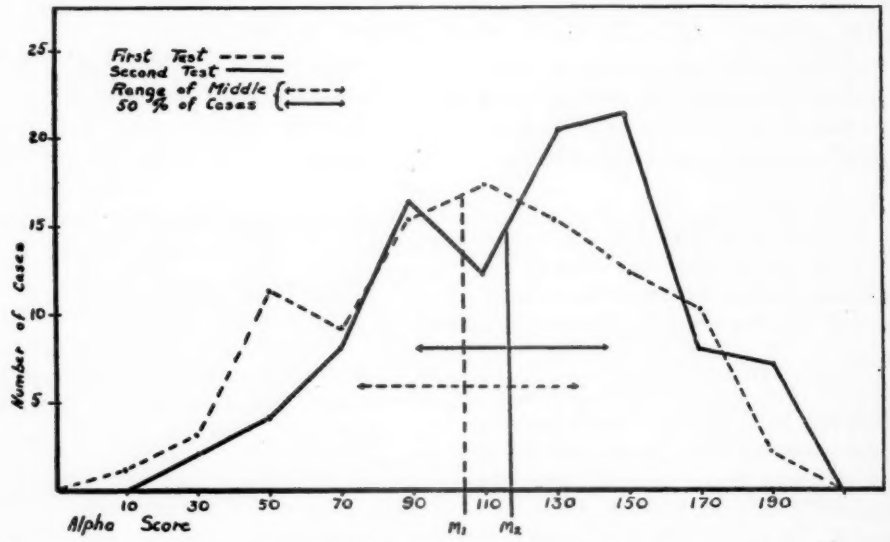


FIG. 1. DISTRIBUTION OF INTELLIGENCE TEST SCORES OF 113 APPLICANTS FOR POSITION ON THE PALO ALTO POLICE FORCE

### OCCUPATIONAL LEVEL OF APPLICANTS

In order to determine the occupational status of applicants a Barr Scale[2] rating was given each occupation at which the men had been employed. Occupations were grouped also, according to Taussig's classification. The highest ratings secured on the Barr scale were given to such occupations as federal internal revenue agent, federal agent in the United States immigration service, and the like; unskilled labor was given the lowest rating. It is significant that only 33 per cent of the applicants were drawn from occupations having a

[1] Reports for various groups of college students show a range of median Alpha scores from 80 to 150, with the average for 21 colleges at 129. *Cf.* Rudolph Pintner. *Intelligence Testing*, p. 270.

[2] The Barr scale is described in Terman's *Genetic Studies of Genius*, Vol. 1, pp. 66–72.

lower Barr rating than policemen, whereas 57 per cent were drawn from occupations which are rated higher from the standpoint of the intelligence level required for success in that occupation.

Only 2 per cent of the applicants belonged to Taussig's unskilled labor group; 13.7 per cent to the semi-skilled; 49.5 per cent to the skilled labor group; and 34.8 per cent to the semi-professional or higher business group.

The age range is from 22 to 46, median 29.6 years. Fifty per cent of the group fall between the ages 25 and 34.

### BASIS OF SELECTION

The high intelligence level of applicants—mean score on Alpha is 117, with the top 25 per cent above 145—together with the fact that they were, presumably, either dissatisfied with positions which rank higher than that of police officer or were unsuccessful at the other task, would seem to indicate an unstable, shifting group and to augur ill for the chances of survival on the Palo Alto police force. In view of the fact that the problem of policing a city of 11,500 population is rather different from that of the large cities for which reports of police tests have been made, it is, perhaps, not surprising to find that men of rather different calibre are required. Perhaps, too, being a university community further affects the matter, since the higher grade men do survive on the force and at salaries lower than those offered by competing occupations.

All applicants were required to take the intelligence test. Men of high intelligence level have been preferred when their other qualifications were satisfactory. Other qualifications were determined by personal interview and, in a few instances, by special aptitude tests which were modifications of those devised by Telford and Moss for patrolmen.[3] These special aptitude tests were discarded after a short trial because the Chief felt that they were not of enough value to him to warrant taking the additional time.

### SUMMARY OF RESULTS

Of the 30 men who have been selected during the two years which the report covers, 7 gave their occupation as policemen, 4 were doing clerical work, 3 were mechanics, and the rest ranged from a day laborer (who had an Alpha score of 135!) to a federal prohibition agent. More than 50 per cent of the group have been drawn from occupational levels above that of policeman. The age range is from 22 to 42 with the median at 32.

Of the men selected 12 have been discharged after from two to six months service, 4 left voluntarily, and 14 have survived. Eight of this number are among the original group selected in 1924, and of the other 6, one has been on the force 10 months and the rest about 5 months.

The median Alpha score of men selected for the police force is 136.5. The median score of men who have been discharged for inefficiency or for conduct unbecoming an officer is 137.0. Men who left voluntarily for better jobs have a median Alpha score of

[3] Telford, Fred, and Moss, F. A. *Suggested Tests for Patrolmen.* Public Personnel Studies, 1924, Vol. 2, 112–144.

171.5. One of these men left the police force to go into grand opera! The median score of survivors is 135.5. Eight are A grade men, one B, and four C+. The median score of men who have survived on the force for two years is 143.5.

The educational achievement of the various groups, determined by the school grade reached, corresponds fairly well with what the intelligence ratings would lead one to expect.

*Median grade attainment of men selected for police force*

| | *Average grade reached* | *Average Alpha score* |
|---|---|---|
| Total | 9.7 | 136.5 |
| Discharged men | 8.5 | 137.0 |
| On police force two years | 10.4 | 143.5 |
| Left voluntarily | 1.5 yrs. Univ. | 171.5 |

Rank order correlation between grade and Alpha score is 0.69, P.E. 0.10.

At the end of the first year Chief Zink rated each man on the staff on the following traits:

I. Appearance
   1. Physical condition
   2. Neatness and bearing

II. Discipline
   3. Discipline
   4. Attitude towards his duty

III. Efficiency
   5. General ability
   6. Exercise of authority
   7. Preservation of order
   8. Handling arrests
   9. Getting and presenting evidence

IV. Moral qualities
   10. Honesty
   11. Cleanness
   12. Energy

Ratings were made on a five point scale where 3 represents the average amount of the trait, 1 a very high degree of the trait, and 5 a very low degree of the trait. When these ratings were averaged for all 12 traits 1.4 was found to be the highest and 3.3 the lowest score. The Chief tends to rate his men highest on honesty (1.8) and lowest on preservation of order (3.1). There is very little correlation between scores on the intelligence test and ratings on these various traits; the rank order correlation is 0.23, P.E. 0.18. The man who ranks highest in intelligence ranks sixth on the traits, and the man with the lowest intelligence score has fourth rank in the trait ratings. It is obvious that the men who have ranked below A level in intelligence have been considered by their superior officer to have other essential qualities in high degree.

## INTERPRETATIONS

Thurstone[4] in an article on the intelligence of policemen based on the results of Alpha tests given to policemen in Detroit, concludes that length of service correlates negatively with intelligence, and that the bright, capable young men do not remain in the police service as a career. The average Alpha score of patrolmen was higher than the average score of sergeants and of lieutenants; with increase in rank the intelligence score was found to decrease. In the Los Angeles survey Fernald and Sullivan[5] report that the highest scores

[4] Thurstone, L. L. *The Intelligence of Policemen.* Journal of Personnel Research, 1922, Vol. 1, 64–74.

[5] Fernald, G. M., and Sullivan, E. B. *Psychology and Public Safety.* California Monthly, October, 1924, 81–83.

were obtained by patrolmen. They state that "patrolmen of the highest mentality do not get promotions to the higher offices, either because they leave the service or because promotion must be attained by some other complex of conditions which they do not survive."

The fact that the average score of men who have remained on the Palo Alto police force for two years is 143.5, a score higher than the average for army officers and higher than that reported as the freshman average at many colleges, demands explanation. The salary schedule offers no solution. The first year the men receive $155 a month, the second year $165 and the third year $175, which is the top. Sergeants receive $190. There are three sergeants on the force. Perhaps the only solution lies in the nature of the present police organization. In 1924 a new chief, young, energetic, and fired with enthusiasm, undertook to reorganize the police force along lines that have been developed by Chief Vollmer of Berkeley, California. Chief Zink of Palo Alto has developed his own methods along lines originally suggested by Vollmer's work. The Chief is not only in thorough sympathy with the use of scientific methods in police work but has been well trained and has himself contributed to the development of such methods in that field. Perhaps the organization itself under capable leadership offers an incentive to capable, intelligent men in police work.

(*Manuscript received December 14, 1926.*)

# The January Conference

TWO hundred and forty people attended the January Conference of Personnel Managers and College Placement Officers held at the Hotel Pennsylvania, New York, on Thursday and Friday, January 20 and 21, 1927. The Conference was held under the joint auspices of the Personnel Research Federation, the National Association of Appointment Secretaries, and the National Committee of Bureaus of Occupations.

Four general topics were covered in separate sessions,—mental hygiene, employment tests, the personal interview, and placing college graduates in business. One additional session was devoted to the presentation and discussion of the report on personnel procedure made by L. B. Hopkins for the Intercollegiate Council on Personnel Methods. Another session was given over to the placement of teachers.[1]

### SIMPLIFIED PRACTICE IN PERSONNEL

An outcome of the Thursday morning meeting of the Committee on Codification of Vocational Information for College Students, was the appointment of a subcommittee to report on a procedure for the coördination of all suggestions made at that meeting for collection of data on occupations and on personnel. On the following day the subcommittee made a report which was adopted by the Conference, and which has already led to concerted action for the improvement of occupational monographs. The report is in part as follows:

> Your subcommittee recommends that a Committee on Simplified Practice in Personnel be formed.
>
> It recommends further that the functions of such a Committee be
>
> (*a*) To make a general plan for a coöperative attack on problems connected with the collection and dissemination of occupational information and with the determination of proper personnel records intended to simplify personnel practice.
>
> (*b*) To formulate specific and workable projects and to arrange for committees of experts to carry them out.
>
> (*c*) To supervise the editing of reports from committees and to approve for publication and distribution any monographs, record forms and other personnel information of use and value to education and to occupations.
>
> (*d*) To secure funds for the carrying out of these projects.
>
> It is felt by your committee that a small permanent staff suitably located is essential to the successful operation of such a committee. It has also seemed to your committee that determination of the proper location of such a permanent staff should be left to decision of the committee itself as a result of the developments of its work. Your committee, therefore, recommends that it be made a further function of the Committee on Simplified Practice in Personnel to select such a staff and to arrange for its maintenance and operation under its own direction.

[1] This session will be reported in the published proceedings of the National Association of Appointment Secretaries.

Your committee further urges that the operation of the plan outlined above should not in any wise delay or prejudice the immediate execution of projects already proposed or initiated by individuals or institutions. It hopes, however, that all such projects might be reported in written form to the Committee together with all record forms intended to be used in carrying out such projects.

Respectfully submitted,
F. F. Bradshaw,
D. S. Bridgman,
A. B. Crawford,
H. D. Kitson,
F. W. Lawson,
C. R. Mann,
P. W. Viets,
C. S. Yoakum, *Chairman.*

The new committee has been organized with Prof. H. D. Kitson, of Columbia University, as Chairman, and with the following other members:

G. A. Bowers, Industrial Relations Counselors, Inc.
W. V. Bingham, Personnel Research Federation
A. B. Crawford, Yale University
Henry S. Dennison, Dennison Manufacturing Company
J. W. Dietz, Western Electric Company
Mary H. S. Hayes, Vocational Service for Juniors
C. R. Mann, American Council on Education
C. S. Yoakum, University of Michigan

### MENTAL HYGIENE

The papers on mental hygiene presented Thursday evening approached the subject from three angles,—the colleges, business and industry, and vocational guidance and placement.

Dr. A. R. Ruggles of Yale University stated that already twelve colleges and two preparatory schools have established mental hygiene work on a full or part time basis, that college mental hygiene is an established fact, and that those working in it feel that it can do much to prevent nervous instabilities in college men and women. It can prevent some nervous breakdowns. It is a distinct aid in increasing the efficiency of men and women in their educational program, as well as in giving better vocational guidance through a better understanding of the potentialities of the individual. Dr. Ruggles cited cases illustrating the problems of the Anxiety Neuroses, Pathological Emotional Instabilities, and Personality Difficulties. He pointed out the comparative ease of adjustment of many of the cases that come to the Mental Hygienist in colleges, as well as the great complexity of other cases, and stated that in many instances the most thorough understanding of physical factors, psychological processes, and psychiatric technique, were required for the readjustment of these individuals.

Dr. Anderson's paper laid special emphasis on the fact that mental hygiene in industry and business did not necessarily concern itself with the mentally abnormal and mentally handicapped; that while work in behalf of these individuals was necessary, it really constituted only a negligible part of the psychiatrist's interest; that he dealt daily with the mental and physical factors involved in the work adjustments of the average so-called normal employee. He outlined many of the common disorders of personality which underlie work failure, and illustrated his remarks with cases showing not only the analysis of such maladjustments, but indi-

cating the possibilities of treatment in clearing up these difficulties and increasing production.

He called attention to the frequency of problem cases in mercantile life. About 20 per cent of the average store population present definite maladjustments of one sort or another. The great variety and nature of these maladjustments were discussed and the medical, psychiatric, psychological, and social implications were outlined.

Much stress was laid upon the fact that we have overdone the point of view of measuring abilities, and have underdone and overlooked those more important elements in the situation that have to do with handicapping the individual in the use of such abilities as he has,—personality disorders, acute and chronic, acquired, temporary, or constitutional; health problems; home difficulties, and the like.

Finally, research work in the way of departmental surveys, resulting in a better employment technique, in the discovery of problem cases and their treatment, adjustment, transfer, or lay-off, the discovery of promotional material and the discovery of departmental conditions that affect unfavorably the mental and physical health of the employee, his work ability, his work attitude, etc., was discussed as one of the most important phases of the psychiatric approach to personnel problems. It was mentioned that from the psychological study of jobs a testing technique was perfected, but that the work showed conclusively that as far as employment in a mercantile establishment is concerned, the most important phase of employment was to be found in the interview, or rather in the training, knowledge and experience of the interviewer; that knowledge of the store and jobs was not by any means the only important requirement for a successful interviewing technique.

The Clinical Interview, the Psychological Tests and the Physical Examination outlined for certain jobs serve largely as a guide to the well-trained interviewer who in reality becomes a diagnostician, bringing together medical, psychological, social and psychiatric data bearing upon the possible job success and work adjustment of an applicant. As far as employment is concerned R. H. Macy and Company stress the intensive and expert training of the interviewer, at the same time doing everything possible to perfect the tools that aid her in her work. But Macy's are no more emphasizing the development of tests themselves than the up-to-date hospital stresses the perfection of surgical knives and other medical and surgical facilities out of all proportion to the intensive training of clinicians.

Dr. Rex B. Hersey emphasized the recent progress of mental hygiene in industry. Dealing, in most instances, with variations and abnormalities in individuals and accepting the industrial environment as relatively permanent, it has achieved many successful changes in adaptation. But Mental Hygiene also connotes a study of environment to the end that the home, social and industrial environments may promote a continuance of healthy and logical thinking in normal individuals. In industry this approach is particularly applicable; the logical task of industry is to furnish a con-

tinuously healthful relationship between the normal worker and his workaday world. The aid of the abnormal should be the task of other agencies.

With this thought in mind, the Department of Industry, University of Pennsylvania, plans, during the whole of next year, to carry on a very careful study of the daily actions of a group of "normal" workers, analyzing as thoroughly as possible the relative importance of all causes of unhealthy mental attitudes. This study will be carried on in close coöperation with the Industrial Committee of the Pennsylvania Mental Hygiene Association.

At the beginning of his paper on Mental Hygiene in Vocational Guidance and Placement, Dr. H. M. Tiebout showed that mental hygiene works in two ways; first, it tries to get at the very earliest indications of behavior or personality deviations and to correct them at once, and second, it tries to arrange the situation in which no behavior or personality difficulties will arise. In a similar way there are two approaches in vocational guidance; the attempt to help the persons who are already manifesting difficulties in their vocational adjustment, and the endeavor to understand the individual's personality and the job's demands and match the two, thus forestalling the development of vocational maladjustment.

In studying the individual's problems in vocational guidance it is necessary to take all aspects of personality into account. Two cases were cited to illustrate the need of a complete picture of the individual before one could hope to give satisfactory vocational advice. The first case was a boy of 15 who was discharged from his last job because he had faked signatures to his messenger receipt blank. His low intellectual capacities prevented his successfully performing the work, but nevertheless his lifelong habit of evading difficulties, such as his playing truant from school, was brought out to indicate that he would never fill a job until his methods of meeting difficulties had changed from underhanded evasions to a frank facing of the realities of life. The second case illustrated the fact that emotional problems outside the job may account for the failure of the individual to adjust himself in his job. This case was a boy whose vocational adjustments were poor because of emotional tensions aroused through having to play second fiddle to an older and model brother. With the removal in disgrace of the older brother from the family scene, the youngster was able to take an interest in his work and do it satisfactorily.

### EMPLOYMENT TESTS

At a largely attended session on employment tests, Dr. Viteles spoke on tests in the factory. American industry has, on the whole, been backward in developing tests for use in the selection of factory workers. American backwardness in this respect is in contrast to developments in Europe. Over one hundred manufacturing firms in Germany are using tests in the selection of both skilled and semi-skilled workers. The larger firms have established testing laboratories of their own. The smaller firms make use of centralized institutes supported

by a number of firms and in some cases subsidized by the government. Similar work is being carried on in other European countries. The investigations differ in extensiveness and in the degree to which they adhere to scientific procedure in developing and evaluating tests. In general there has been a pronounced trend away from the shoddy investigations of the period immediately following the War in the direction of more painstaking analysis of the value of tests used in selection.

The outstanding characteristics of the work which is being done abroad on tests for factory workers can be summarized as follows:

1. Attention is centered on the measurement of special abilities necessary for trade success and not upon the measurement of general intelligence stressed so much in the few American investigations.

2. The centralization of testing for smaller plants in "psychotechnical institutes" is a significant development.

3. Labor has been called upon to coöperate in the development of tests for factory workers. In many cases an applicant for an apprenticeship in a trade is required to pass the tests before being admitted to the union.

4. Ample time is allowed for testing applicants in most of the testing projects. In some instances the applicant for employment is paid for the time spent on the tests.

5. There is a tendency toward automatizing the tests, that is, toward making them self-administrative and self-recording. This makes it possible to test applicants for factory positions in groups. There is a growing emphasis on the extreme importance of extended follow-up in evaluating test results.

The next speaker, Mr. F. K. Daniels, described the experiences of the Aetna Life Insurance Company in hiring clerical help. This firm employs about 3000 persons in its home office at Hartford. Since Hartford is preëminently an insurance city, young people who wish office work must generally orient themselves toward the insurance companies. When school closes the personnel managers are flooded with applicants and must make their choices at once, as they are apt to find that in a month or so everyone has found a job. The needs of the organization are best met by young high school and college graduates. Of those hired last year, 72 per cent had a high school education or better.

The experience of this company has been convincingly in favor of the use of a mental alertness test in the employment office, and such a test will be a permanent part of the employment process, along with the personal interview, the application blank, and the physical examination.

Dr. M. A. Bills presented the results of a study of office workers at the Aetna Life Insurance Company. The subjects were 130 workers hired between June, 1925, and June, 1926, who remained long enough with the company to receive the regular six months rating made by the section and division heads. Scores in Test VI (Mental Alertness) of the Bureau of Personnel Research, Carnegie Institute of Technology, when compared with ratings by division heads, showed very definite critical scores. Of those whom the

division head rated above average for his division, 80 per cent scored above 70 in the test, while of those rated below average, 53 per cent scored above 70. Of those rated above average 63 per cent scored above 90, while of those who were rated below average, 35 per cent scored above 90.

Mr. O. W. Eschbach, in discussing the object of intelligence tests in training courses for college graduates, spoke of the experiences of some of the operating companies of the American Telephone and Telegraph Company. One operating company devised a mechanical electrical test and and tried it on 300 employees. The test was found to differentiate very well among occupational groups. The ranges of test scores for the various groups are as follows:

| | |
|---|---|
| Engineers and special inspectors | 80–100 |
| Assistant engineers | 75– 90 |
| Wire chiefs | 70– 75 |
| Central office men | 60– 70 |
| Repairmen | 56– 60 |
| Cable men | 45– 50 |
| Installers | 30– 40 |
| Linemen | 0– 30 |

Scores in the test are closely correlated with amount of schooling. The test has been useful in selecting men and allocating them to different classes of work. When tried on college graduates in their introductory training course it was found to be too easy and did not give enough spread of scores.

One of the operating companies gave a mental alertness test in 1915 to sixteen of its engineers, of whom eleven are still in the employ of the company. The test scores correlate 0.81 with ranking of these men on value to the firm in 1920, and 0.76 with value to the firm in 1925.

Mr. Eschbach expressed the opinion that intelligence tests should be used in connection with the interview in selection. He also suggested that tests given after hiring should be used for self-analysis and improvement, rather than for purposes of correlation.

Dr. A. T. Poffenberger in summarizing the discussion, said that the old question so frequently asked, "Are employment tests useful or worthless?", is no longer pertinent in view of the evidence submitted, and it is more logical to ask, "How useful are they?". It is now possible to state just how useful they are in statistical terms, by showing what the chances of successful selection by a given employment device are in comparison with the same measure for other devices. When employment tests are allowed to compete in this way with other employment devices, they usually demonstrate their superiority. A still further question should be asked. "Is the employment test equally useful in all employment situations?" It has been frankly recognized that all occupations do not lend themselves equally well to the testing methods. For example, it is relatively easy to prepare tests for clerks and machine operators compared with the task of preparing tests for business executives of high rank.

The most vital need in the further development of employment tests and in increasing the chances of successful selection, is the availability of satisfactory criteria of success in a job. This need can be satisfied only through the coöperation of employers interested in selection methods, who will

keep adequate records of performance of employes and develop standards which will make it possible to grade their achievement.

### PLACING COLLEGE GRADUATES IN BUSINESS

The topic for the Friday afternoon session was the placement of college graduates in business. The college placement officers were represented on the program by J. E. Walters, of Purdue University, G. E. Bates, of the Harvard Graduate School of Business, C. E. Clewell, of the University of Pennsylvania, and S. S. Board, of the Yale Graduate Placement Bureau. Each of these speakers outlined the procedures in use at his institution. Industry was represented on the program by E. B. Roberts, of the Westinghouse Electric and Manufacturing Company, C. R. Dooley, of the Standard Oil Company of New Jersey, H. E. Von Kersburg, of R. H. Macy and Company, and G. M. Shepherd, of Kissel, Kinnicutt Company. By exchanging experiences in this way each group was able to get the feel the problems faced by the other group and to find what adjustments were necessary for efficient coöperation.

Col. R. I. Rees contributed a summary of recent research on this topic.

At Purdue University, according to Mr. Walters, occupational guidance begins before admission by giving the high school student information about engineering as a career through literature and lectures. Before admission, the prospective student is asked to give complete information about himself, including a self-analysis of his personality and his occupational preferences.

During the latter part of the first year at Purdue, the freshman gives fifteen references, namely, five teachers five students, and five others. Personality rating blanks are sent to these fifteen references for ratings in comparison with men of similar age, educational preparation and environment. These fifteen ratings are averaged and if the general average is in the lowest quartile of the class, the student is called in for a conference by the Director of Personnel. The following rated characteristics are discussed: Address and Manner, Attitude, Character, Cooperative Ability, Disposition, Industry, Initiative, Judgment, Leadership, and Native Capacity. Development of his personality is discussed in detail and a possible method of improvement is pointed out. This procedure is repeated again in the Junior year.

While the personality development program is in progress, the student's scholarship, health, character, and engineering aptitudes are being watched and recorded. He is assisted in getting employment during summer vacations in the line of work of his major subject. Summer employment helps greatly in guiding the student vocationally and at the same time affords the industrial concerns an opportunity to judge whether he is suitable for permanent employment after graduation.

The student's record is classified and tabulated in the Findex System. Lists of seniors are given to industrial concerns upon specification of the kind of men they desire and the work in which they will be placed. Some

companies take men entirely upon the recommendation of the University.

Surveys of occupation assist Seniors in bringing to their attention more positions in particular vocations. The personnel office keeps a "Who's Who" of hundreds of companies who employ engineering students, for information and guidance of the seniors.

Personnel Information Blanks which prevent difficulties with Application Blanks, are given to seniors in order to present them properly to prospective employers.

Adaptation of recent graduates to their work proves helpful because most of the difficulty of placement comes during the first two years after graduation. Purdue follows up its graduates during that time. A progress report blank is sent to the employer of every engineering graduate about fifteen and thirty months after graduation. If the report is unsatisfactory, an effort is made to suggest improvement to the graduate.

Information on positions available for Purdue alumni are given in alumni publications each month for the benefit of the unemployed graduates.

Effective placement can be accomplished in an engineering college (1) if correct personnel records are used in synchronizing the student's occupational preference and his vocational fitness; (2) if an effective program of the development of the student's personality is maintained; (3) if a critical study is made, before placing seniors, of the concerns interested in employing graduates; (4) if the Juniors are tried in industry during their summer vacations; and (5) if an effective follow-up system is maintained to check the progress of recent graduates and to straighten out misunderstandings which occur.

Mr. Bates first distinguished the nature of placement work in a graduate professional school from that of the college placement office. He then outlined the procedure adopted for placing the graduates of the Harvard Business School. Though complete records are kept for the use of employers, they are not brought forward in dealing with students. Each student is made to feel that he is not the representative of one card in an index file which is being handled by mass production methods, but rather a friend for whom the Dean is attempting to secure a position through his wider contacts with industry. Every effort is made to equip the student to make his own vocational decision. The two year curriculum is so focused that the student is practically forced to reach a reasoned conclusion in his last year.

Mr. Clewell described the University Placement Service of the University of Pennsylvania. On September 20, 1926, the Provost and Trustees of the University established a new department known as the University Placement Service, in which has been vested the supervision of the placement work for the entire University. Placement work had been previously conducted under the direction of several University agencies, but this new service centralizes all of it. The placement service functions through four subdivisions which conduct or supervise respectively, (1) student employment, (2) senior placement,

(6) teachers' appointments, and (4) graduate placement.

In reality this new service is only a larger plan of that which is known as the Graduates' Educational Service. The underlying purpose is to establish a close bond of sympathy between the University and its alumni.

The service aims to guide the large number of students who engage in part-time work so that such work contributes as far as possible to the work to be undertaken after graduation. Many business and industrial firms have coöperated in this respect.

The problem of senior placement is handled by a committee which is composed of a representative from each school or department. Each representative supervises the senior placement problem in his own particular school.

One of the most important functions of the service is to inform graduates who are in positions of leadership, and also industry in general, that experts and executives for practically every division of an industrial organization can be constantly found through the University.

While placement work of this character is not new, the angle from which the approach is now being made is somewhat different, and the scope of the work thus centered in one bureau is of such proportions that the results will undoubtedly command the interest of all those who may be engaged in similar work elsewhere.

Mr. Board spoke on the development of the Yale Graduate Placement Bureau, Inc. On January 1, 1926, this bureau undertook to coördinate the graduate placement work of various Yale organizations and to bring it under a common head. It was felt desirable to locate this office in New York so that it would be at the center of business activities and would be more or less independent of campus influences. The Bureau has nevertheless worked in very close coöperation with the undergraduate Bureau of Appointments and the University officials, and its efforts are thoroughly coördinated with the plans at New Haven.

There are three reasons for the existence of such a Bureau. In the first place it affords an opportunity to follow up college men and determine the reasons for their success and failure. In the second place, it can help to take care of some of the desirable and necessary readjustments which occur when college men go to work. The third function is that of helping to gather vocational information which can be transmitted back to the college and be of value in helping to avoid some of the difficulties in which men find themselves after graduation. The service offered by the Bureau is designed to be national in scope and will be extended to cover the entire field of placement of Yale graduates as rapidly as opportunity permits.

An analysis of the applicants who have come to the Bureau shows some very interesting conditions. While there is a big peak of applicants among the academic graduates in the first four years after graduation with a sharp falling off in the fifth year, a good many of the scientific graduates seem to be looking for jobs every other year for a period of ten years, at which time they too settle down. No con-

clusions should be drawn from this situation without further study, but it points to some interesting possibilities and would certainly warrant more investigation.

Mr. Roberts, representing the Westinghouse Electric and Manufacturing Company, was the first speaker in the industrial group. He pointed out the undeveloped possibilities in the field of college personnel. Such work as that done by Dean Potter and his staff at Purdue points the way for other schools. Formerly industrial representatives found it necessary to gather information about all engineering graduates in order to have sufficient data regarding the few who would be interested in the company in question. The gathering of this personal information, Mr. Roberts felt, is properly a function of the school rather than of industry. The problem of adjusting engineering graduates to business involves two aspects—selection and segregation. The process of selection should have for its aim the placement of each graduate in the particular type of business or industry in which his tastes and aptitudes give him the opportunity to work most effectively. The problem of segregation—very complicated in those industries which are highly organized—involves the separation of the graduates entering that particular business into groups in accordance with the functional arrangement of that business itself. He did not advocate, however, the rearrangement of engineering curricula on a functional basis, but insisted on the importance of giving the engineering graduate an opportunity to study and understand the several engineering functions, together with knowledge of the personality and intellectual requirements for success in each, before aligning himself permanently with any one of them. When this question has been settled, the problem is to give each graduate in a systematic and effective way the background of practical work and contact which he ought to have to make a success in his chosen field.

Mr. Roberts then outlined the program developed within the Westinghouse Company for meeting these requirements. He indicated the great care which is exercised by the Westinghouse Company in selecting men for work in its organization. He gave the approximate proportions of men selected who go into each of the functional divisions of the company. He felt that solutions to the problem of the placement of the engineering graduate in business are only undertaken at the time of his employment by an industrial representative. If the problem is solved within a year after the entry of the graduate into a large firm, it has been solved in about as short a time as practicable.

The Standard Oil Company of New Jersey, according to Mr. C. R. Dooley, employs annually about twenty graduates of engineering colleges. Most of these are mechanical engineers, a few being electrical and chemical engineers. In choosing these men, the company looks for character and personality. It feels that engineers, as a rule, do not sell themselves well, they are not good talkers and are not responsive. An engineer is often not enough interested in things outside of his immediate line, he is often not

widely read. Yet a good personality is as essential to an engineer as to any other man, for he must be able to get along with other men; and as time goes on and he advances he must have the qualities which will enable him to supervise others.

These men are given a year's course of training at the company's refineries in New Jersey. The first six months are spent in learning the various refinery processes, so as to give the students a rudimentary knowledge of the oil business. During the last six months an attempt is made to put them on the kind of work for which they have shown aptitude—estimating, listing, testing, etc. Their pay during the training period is $125 a month, enough to live on. During the year the students are under the supervision of the Personnel Department, although they work at regular refinery jobs. Special instruction is given two or three times a week, and the students are required to make reports on their work. Close coöperation is maintained with department heads.

Mr. H. E. Von Kersburg, Employment Manager of R. H. Macy & Co., Inc., suggested that the colleges should begin to direct their men toward their business careers in the Sophomore year. He felt that it should be made compulsory for all students who have not definitely decided upon some profession to work during the summer vacation after their junior year in the particular industry in which they are most interested.

He stressed the point that representatives of many organizations in visiting the colleges oversold their concerns. It ought not to be necessary for any one to sell his organization, as each college man ought to reach his conclusions from a factual story and select the organization himself.

In visiting the colleges we should strongly advise all young people whom we meet to shop around, to talk with representatives from all businesses, and get a good picture of the different fields that are open. As a result, when the time for a decision comes they will be able to determine better the kind of work and the organization they want to join.

Mr. Shepherd pointed out the advantages of employing college men during the summer of their junior year. This gives them a picture of the business which they are considering and enables the business itself to judge them as applicants.

A somewhat limited inquiry by Col. Rees among college placement officers and others disclosed very little quantitative analysis of results in the placement of college graduates. In general, records which would permit such an analysis have not been kept long enough to obtain definite results. Less than two years ago such a record keeping was initiated for the Bell System Companies at headquarters. It covers the major facts about each graduate's education, his achievement in college, time and method of entry into the System, and later history there. A few preliminary studies have already been made from it which show some interesting trends, but it will be several years before conclusive evidence is available. Even with a large amount of data, it is doubtful how definitely the influence

of single factors can be determined because of the many factors bearing on each individual case. Col. Rees expects, however, to find some significant relations between the type and degree of success in the telephone business and such factors as scholastic achievement in college, extra-curricular achievement there, time and method of entry into the Bell System, amount of previous industrial experience, etc. The few studies already made indicate that the men selected at the colleges by the Bell representatives and entering the System directly are more stable and progress somewhat more rapidly than those who come in other ways. This might well be expected, but the differences are not great and more time is necessary before even this can be regarded as proven.

### THE PERSONAL INTERVIEW

The dinner meeting held on Friday was attended by over 150 persons. The personal interview was discussed by four speakers—from the standpoint of guidance, by Dr. Douglas Fryer; placement, by Dr. Mary H. S. Hayes; employment, by John Mills; and research, by Dean F. F. Bradshaw.

Dr. Fryer pointed out that the vocational guidance interview presents a three-fold problem. The first is that of objective. The second has to do with the principles and laws of human nature governing the applicant-counselor situation. The third has to do with the technique of the interview.

The majority of personnel workers, it was found, emphasized the specific and immediate placement adjustment of the applicant, but it was pointed out that this should be the objective only of the placement interview, and that the guidance interview has accomplished its major purpose when the applicant is brought to realize the nature of his mental adjustment in general to the occupational world.

A first principle of vocational guidance was stated as the offering of accurate information in terms of scientifically established probabilities. The stimulation from information of this sort was considered to bring about the development of a vocational plan, or organized vocational motivation, a second principle of guidance. A problem of the interview was held to be that of placing the responsibility of action definitely on the shoulders of the applicant. This led to the consideration of another principle of vocational guidance, which was given as the only means for permanent guidance success, that of allowing freedom of choice and decision to the applicant.

The procedure of the vocational guidance interview was outlined to include the following steps: (1) Establishing of *rapport* with applicant and setting up motivation for self-guidance, (2) assembling of detailed personal and occupational information, (3) preliminary diagnosis or study of the case record in which a plan for interview work is made, (4) preliminary prognosis or outlining possible remedial plans, (5) the interview proper between counselor and applicant (possibly including numerous conferences), in which all information is offered to applicant.

Dr. Hayes spoke on the personnel interview from the standpoint of placement. The interview in place-

ment has the two-fold function of obtaining and conveying information for the mutual benefit of the employer and the applicant. It seeks to learn from the applicant his vocational interests and plans, and such specific qualifications or deficiencies as especially fit him or certainly debar him from certain jobs or types of jobs, It aims to give information to the applicant regarding the industrial prospects open or obtainable and to tell him of the kind of preparation or training necessary to realize his industrial ambitions, and how and where it is possible to get such training.

The placement interview strikes a mid point between the interview as a function of the guidance counselor and the interview as given by the employment manager, in that it is less comprehensive and more specific than one and more comprehensive and less specific than the other. Although less comprehensive in its informational content, it is more specific than the guidance interview in that it conforms to the details of the local situation. That is, it does not tell you, for example, the minimum and maximum salaries for a given trade but it tells you what you as a sixteen year old boy with an eighth grade education and two year's experience delivering packages can expect to get. And, on the other hand, it is less specific than the information given by the employment manager who is able to give these intimate details regarding a particular job known only to one on the inside.

In its placement office, the Vocational Service for Juniors aims always to keep complete and constantly revised records. They investigate all jobs and make a rough job analysis, giving particular attention to the type of workers employed. They have a form of personality rating which is duly recorded. Dr. Hayes stated that each counselor bases her judgment on norms from her own experience with applicants and with jobs, and since the experiences of counselors differ, each hesitates to place an applicant interviewed by another counselor. The concept of the average job or applicant must be conditioned by the range of experience of the interviewer.

Mr. Mills presented an interview question which gives indications of vocational interests in terms free from the prejudices ordinarily attached to words used to describe various jobs. The question supplements and gives check indications to those previously described in his paper on "Engineering Aptitudes."

The question may be formulated in this way: Just as each of us has a more or less definitely balanced ration of food, to which we tend to adhere over a reasonable length of time, so each of us has a temperamentally necessary ration of work in attaining which we will be most satisfied and presumably most productive. To determine this ration we divide work into seven types: First, study, the act of increasing and intensifying one's intellectual equipment; second, creative effort, the act of originating something; third, routine, the repetition of mental operations; and fourth, manipulation, the coördination of muscular movement illustrated by arranging cards or by driving an automobile. These four types of work may be

performed by the individual alone and without personal contact with other human beings. The three remaining types involve human contacts. They group themselves under contacts with one's superiors, one's equals, or one's inferiors. These terms carry no stigma and do not necessarily represent intrinsic differences. The comparative terms are used to represent momentarily existing differences, whether of economic situation or of status in a profession or organization. A salesman for example has contact with superiors economically since they are buyers where he is seller. A professor in a classroom deals with those professionally his inferiors.

Each person will prefer some particular proportion of these seven kinds of work. Assuming a ten unit day, what on the average and over a reasonable length of time, will be the desired number of units of each type of work?

Dean Bradshaw, who spoke on the interview from the standpoint of research, made the point that the interview is as naturally an object of scientific research as any other phenomenon of human behavior. The constant use of the interview as a method of getting and giving information, of adjusting attitudes, and of forming judgments makes scientific knowledge of its processes essential. The great expenditure of time and money in interviewing makes error and wastage in that activity a costly matter.

Interviewing should exclude all that can be done better, or more cheaply and as well in other ways. "Pre-view" records should be made up before the interview by clerical help or by the interviewer himself. Interviewing should exclude processes whose results are seriously unreliable. Most personal judgments fall in this class.

On the other hand, interviewing should include those processes which can only be accomplished better by it.

An example of the first is the establishing of *rapport*. Examples of the second are communicating or eliciting confidential information, and the immediate follow-up of behavior clues which indicate significant emotional experiences and traits.

Within these economical limits of interviewing it might be wise further to restrict initial research projects, at least such as are to be coöperative, and unless such research is coöperative the variables of personality and circumstance are certain to prevent valuable results.

Such projects in coöperative research in the interview process seem at once to fall into two large divisions. Those projects limited to one class of interview, such as the employment interview or the fact-finding interview of the social worker, to be participated in only by those doing such interviewing, would comprise one class. The other would embrace projects concerned with elements common to all types of interview, such as the reliability of personality judgments. In such projects it would be most valuable to have all types of interviewers participate. A beginning on this latter sort of project would seem most in need of encouragement at this time, since the intra-group projects have been under discussion and under way for some time.

Many suggestions occur as to pos-

sible researches in this latter class. Two definite sorts of study seem most appropriate as a beginning. These may be expressed in question form. What value have personality, ability, or character judgments as legitimate interview aims and results? What behavior clues are significant for an interviewer as indicating important and discoverable emotional peculiarities of the interviewed?

The importance of the preceding questions would seem obvious. The manner of attack is rather debatable. As illustrative, rather than essential, the following plan is suggested:

1. Assembling a joint committee on interview research, representing those using the interview in (*a*) educational and vocational guidance, (*b*) employment, (*c*) placement, (*d*) social work, (*e*) psychiatry, together with an expert in psycho-analysis, clinical psychology, and psychological tests.

2. Formulation by this committee of working definitions, and qualitative and quantitative terminology for record keeping.

3. Enlisting coöperation of the groups concerned in proposed projects.

4. Collection and publication in summary of results from such research as may seem to be significant.

# Book Reviews

## JOB ANALYSIS AND CURRICULUM CONSTRUCTION IN THE METAL TRADES INDUSTRY

*By Walter Benton Jones. New York: Columbia University, 1926. Pp. 104*

REVIEWED BY FREDERICK G. BONSER

In 104 pages, Dr. Jones has presented a compact and clear account of a basic method of job analysis and curriculum making for trade education. His problem is specific, and he states it in this way: "To develop a satisfactory technique in job analysis for the construction of a curriculum to train apprentices in the metal trades industry." As the medium through which to work out the technique, the pattern makers' trade was chosen, a trade in which Dr. Jones has served an apprenticeship and worked as a journeyman.

In developing the complete technique, the author proceeded by the following ten steps:

1. Formulating the objectives of the curriculum for training the pattern maker.
2. Writing job specifications containing all of the important activities and duties of the occupation resulting from an analysis of the occupation.
3. Making a check list of the elements of trade skill and knowledge which the pattern maker must develop by means of numerous projects, no one of which contains all elements.
4. Classifying 4000 drawings of the products of a large manufacturing plant which cooperated in the study, organizing these into 28 major groups, and selecting from 3 to 5 samples that were typical from each group—125 samples in all—for detailed study and analysis.
5. Analyzing these 125 samples, using the check list to find the degree to which the products made involved the essential job elements.
6. Preparing a trade element chart, condensing the trade elements into a form showing relative frequencies of elements, and making inspection and use simple.
7. Making an outline of instruction, showing the specific points to be taught in their appropriate order of difficulty and sequence.
8. Writing unit instruction sheets for illustrative units, both of standardized units and of units based upon jobs analyzed.
9. Establishing standards and measured results of instruction for illustrative units.
10. Constructing record forms for recording work completed and progress made, including personnel forms for recording useful personal data.

After the technique was developed on the basis of the analysis of the 4,000 drawings of the products of the Westinghouse Electric and Manufacturing Company of East Pittsburgh, and the related steps were completed, the plan was tried out for one year in the Part-Time Vocational School of Milwaukee, Wisconsin. Here the adaptation of the plan to the conditions was found to be wholly practicable, and results were satisfactory, thus validating the method as based upon the job analysis procedure.

The most unique element in the technique developed was the use of drawings as the basis of analysis. But the whole study and its presentation are somewhat unique in the compactness, directness and completeness with which the problem is so comprehensively treated. There is a chapter on a proposed curriculum for pattern makers, including a consideration of the personal qualities of pattern makers; a chapter on teaching the habit of planning one's work; a section of the Appendix on job specifications for superintendent of pattern shop and pattern storage; an oral trade test for wood pattern makers; and two bibliographies. The book contains a sufficient number of charts, diagrams, analysis blanks, and forms to make meanings clear and to serve as suggestive models for using the technique.

The study is a contribution which should be directly helpful to anyone interested in the technique of job analysis and curriculum making for vocational courses in any trade field, and suggestive for those concerned with preparing vocational courses in other fields. It is a scientific piece of work with positive, constructive results, and nothing more gratifying can be said of any worthy piece of research.

## PROCEDURES IN EMPLOYMENT PSYCHOLOGY

*By Walter Van Dyke Bingham and Max Freyd. Chicago: A. W. Shaw Company, 1926. Pp. xi + 269*

Reviewed by Ben D. Wood

"Procedures in Employment Psychology" meets a long-felt need on the part of employment managers and personnel officers in many branches of industry and education. It is an eminently readable book from the viewpoint of the general business man and rightly emphasizes the importance of investigation and research in the individual industrial or educational institution. To quote from the preface, "So complex is the task of occupational analysis and individual placement, so numerous are the independent variables," and so variable are the conditions in individual industrial institutions, that the greatest need at the present time is not so much a set of definite rules to guide employment managers and personnel officers in the discharge of their daily duties, as of a manual to guide them in conducting sound research in their individual plants. The book meets this need admirably. It is a clear and concise summary in very convenient and usable form of the fundamental principles of research and investigation in the most complex task that social science has yet undertaken, namely, vocational and educational guidance.

In reading this book one easily gets the impression that its authors have received many requests for help and guidance from employment managers and personnel officers and industrial captains throughout the whole gamut of modern industry. The coming of this book to my desk has made easy the answering of a considerable number of such letters which have been in my basket awaiting reply for some time. Those who have received such letters do not need to be told that an adequate answer to any one of most of them would constitute a sizable volume. Dr. Bingham and Dr. Freyd have written such a volume, and so well have they chosen and treated their topics, that the best we can do in answering inquiries from officers interested in personnel is to refer them to this book.

## VOCATIONAL GUIDANCE AND COUNSELING

*By Allanson H. Edgerton. New York: Macmillan Company, 1926. Pp. 213*

REVIEWED BY MARY H. S. HAYES

In a thoroughly readable little volume, Mr. Edgerton has discussed the need for and the field of vocational counseling, as well as the duties and training of counselors.

A chapter devoted to the findings from a survey of work done in 143 cities, as well as scattered tables of other smilar data, interrupts somewhat the continuity of his story and might better have appeared in a separate paper.

There is a careful job analysis of the duties of the counselor in various types of secondary schools and a discussion of their relation to the other members of the school staff. Considerable space is devoted to methods of collecting occupational information and there are a number of valuable illustrations.

The necessity of adequate training and experience for persons who are to be employed as counselors in the school system is emphasized, and the risk involved in assigning these duties to interested but untrained advisers is well pointed in his reference on page 71 to "an arbitrary method of tinkering with childrens' minds."

In a book, therefore, that is short enough to be read, clear enough to be understood, and sane enough to be recommended, Mr. Edgerton has done a very real service for those of us who are constantly besieged with the query "How do you give vocational guidance."

## EMPLOYMENT STATISTICS FOR THE UNITED STATES

*By Ralph G. Hurlin and William A. Berridge. New York: Russell Sage Foundation, 1926. Pp. xvi + 215*

REVIEWED BY O. W. BLACKETT

This is a report of the Committee on Governmental Labor Statistics of the American Statistical Association, recommending that the Bureau of Labor Statistics act as coordinating agent for local bureaus engaged in the collection of employment data. It is a workable compromise whereby the advantages of centralized and decentralized collection may be in large measure retained. It should be of interest to state bureaus and to private organizations which gather employment figures.

Chapter II gives a brief and very moderate statement of the value of employment data. "It is impossible to demonstrate fully, on the basis of studies already made, the usefulness and the significance of statistics of employment and earnings as material for research on this important subject. . . . It is possible to suggest the questions on which they are likely to throw light."

The greater part of the book is a guide to the sources and technical methods to be used in the study of employment.

## POPULATION PROBLEMS IN THE UNITED STATES AND CANADA

*Edited by Louis I. Dublin. Boston: Houghton Mifflin Company, 1926. Pp. 318*

This volume is an outgrowth of papers presented at the Eighty-Sixth Annual Meeting of the American Statistical Association, December, 1924. Papers are included on the most important phases of the population problem, each by an authority in his field. Among the subjects considered are the possibilities of future population growth and the maximum numbers which can be supported in this country, the urbanization of population, population and immigration, and population and labor supply.

# New Books

ATKINS, PAUL MOODY. *Factory Management.* New York: Prentice-Hall, Inc., 1926. 399 p. $5.00.

BLACK, JOHN DONALD. *Introduction to Production Economics.* New York: Henry Holt and Company, 1926. 991 p. $4.50.

BLANTON, SMILEY, M.D., AND BLANTON, MARGARET GRAY. *Child Guidance.* New York: Century Company, 1927. 319 p. $2.25.

BRUBACHER, A. R. *Teaching: Profession and Practice.* New York: Century Company, 1927. 318 p. $2.00.

Bureau of Public Personnel Administration. *Proposed Classification and Compensation Plans for Library Positions.* Report to the Committee on the Classification of Library Personnel of the American Library Association. Washington, D. C.: Bureau of Public Personnel Administration, 1927. 208 p. $2.15.

Bureau of Vocational Information. *Marriage and Careers: A Study of 100 Women Who Are Wives, Mothers, Homemakers and Professional Workers.* New York: Channel Bookshop, 1926. 121 p.

COLLINS, MARY, AND DREVER, JAMES. *A First Laboratory Guide in Psychology.* New York: E. P. Dutton and Company, 1926. 116 p. $1.60.

COMMONS, JOHN ROGERS, AND ANDREWS, JOHN BERTRAM. *Principles of Labor Legislation.* New York: Harper and Brothers, 1927. 632 p. $3.00.

DEXTER, ROBERT C. *Social Adjustment.* New York: A. A. Knopf, Inc., 1926. 436 p. $5.00.

FERNALD, CHARLES H. *Salesmanship.* New York: Prentice-Hall, Inc., 1926. 491 p. $4.50.

FINNEY, ROSS L. *General Social Science.* New York: Macmillan Company, 1926. 479 p. $1.60.

FULLER, RAYMOND G., AND STRONG, MABEL A. *Child Labor in Massachusetts; An Inquiry Under the Auspices of the Massachusetts Child Labor Committee.* Boston: Massachusetts Child Labor Committee, 1926. 170 p.

HART, JOSEPH K. *Adult Education.* New York: Thos. Y. Crowell Company, 1927. 354 p. $2.75.

HOLLINGWORTH, HARRY L. *Mental Growth and Decline.* New York: D. Appleton and Company, 1926. 408 p. $3.00.

HURLIN, R. G., AND BERRIDGE, W. A. *Employment Statistics for the United States.* New York: Russell Sage Foundation, 1926. 215 p. $2.50.

IRMINA, SISTER MARY. *A Study of Language and Grammar Tests.* Educational Research Bulletins, Vol. 1, No. 8. Washington, D. C.: Catholic Education Press, 1926. 40 p.

JONES, WALTER BENTON. *Job Analysis and Curriculim Construction in the Metal Trades Industry.* New York: Columbia University, 1926. 104 p. $1.50.

LIPPS, THEODOR. *Psychological Studies.* Second Revised and Enlarged Edition. Translated by Herbert C. Sanborn. Baltimore: Williams & Wilkins Company, 1926. 328 p. $6.00.

MACARTNEY, CLARENCE A. *The Social Revolution in Austria.* New York: Macmillan Company, 1926. 299 p. $3.40.

MANSON, GRACE E. A Bibliography of the Analysis and Measurement of Human Personality up to 1926. Reprint and Circular Series of the National Research Council, No. 72. Washington, D. C.: National Research Council, 1926. 59 p. $1.00.

MCCLUNG, REID L. *Earning and Spending: A Series of Radio Talks on Economics.* New York: Codex Book Company, 1927. 200 p. $3.00.

MILNES, NORA. *The Economics of Wages and Labour.* London: P. S. King, 1926. 197 p. 8s. 6d.

NORTH, CECIL CLARE. *Social Differentiation.* Chapel Hill, N. C.: University of North Carolina Press, 1926. 352 p. $2.50.

PATTERSON, HOMER LA FERNE. *Patterson's American Educational Directory.* Chicago: American Educational Company, 1926. 996 p. $6.00.

PRYDE, JOHN. *Recent Advances in Biochemistry.* Philadelphia: P. Blakiston Sons and Company, 1926. 355 p. $3.50.

RITTER, WM. E., AND BAILEY, EDNA W. *The Natural History of Our Conduct.* New York: Harcourt, Brace and Company, 1927. 348 p. $3.50.

STEWART, BRYCE M. *Canadian Labor Laws and the Treaty.* New York: Columbia University Press, 1926. 501 p. $6.00.

THOMAS, FRANK W. *Principals and Technique of Teaching.* Boston: Houghton Mifflin Company, 1927. 434 p. $2.00.

VAN WAGENEN, M. J. Educational Diagnosis and the Measurement of School Achievement. New York: Macmillan Company, 1926. 283 p. $3.00.

WALLING, WM. E. *American Labor and American Democracy.* New York: Harper and Brothers, 1926. 418 p. $2.50.

WALSH, CORREA M. *Four Kinds of Economic Value.* Cambridge, Mass.: Harvard University, 1926. 138 p. $1.75.

WARBASSE, JAMES P. *Cooperative Democracy.* New York: Macmillan Company, 1927. 345 p. $3.00.

WEISBORD, ALBERT. *Passaic.* Chicago: Daily Worker Publishing Company, 1926. 64 p. $0.15.

WELLS, H. G. *Wells' Social Anticipations.* Edited by Harry W. Laidler. New York: Vanguard Press, 1927. 165 p. $0.50.

WOOD, CHARLES W. *The Myth of the Individual.* New York: John Day Company, 1926. 314 p. $2.50.

WOOD, THOMAS D., M.D., AND HENDRIKSEN, ETHEL M. *Ventilation and Health.* New York: D. Appleton and Company, 1926. 227 p. $2.00.

# News Notes

### A NEW BIBLIOGRAPHY ON HUMAN PERSONALITY

The National Research Council has published a new bibliography by Dr. Grace E. Manson, covering 1364 titles on the Analysis and Measurement of Human Personality up to 1926. This is a volume which all personnel research workers should have at hand. A valuable feature is an alphabetical list of over 350 traits, with references to books and articles which deal with each of them. The bibliography is also cross-referenced in various ways. The volume may be obtained at one dollar by applying to the National Research Council, Washington, D. C.

### LIFE HISTORIES OF MIGRATORY WORKERS

The much lamented Carleton H. Parker in collaboration with F. C. Mills and P. S. Brissenden, made an investigation of seasonal, migratory, and unskilled labor in California. The findings and conclusions were never published. Thanks to Dr. Brissenden, a manuscript of this report has been filed with the Personnel Research Federation and will be placed at the disposal of any investigator who is interested. The report is in five sections as follows:

I. Employment Agencies
II. Statistical Results from the "Life History" Stories
III. Results of Data Gathered "On The Road" as to Traveling and Living Conditions among Floating Laborers
IV. The Labor Market in Certain Sections and Industries
V. Statistics from Labor Camp Reports

The following paragraphs are quoted from Section II dealing with the life histories of these migratory workers:

"The following statistics were compiled from one hundred 'life histories' selected at random from those on file. They have been obtained from casual laborers, itinerants of various kinds, city vagrants of the 'wine bum' type, and others picked up in various places throughout the State. Considerable care has been taken to insure accuracy in the collection of this material, so the findings are of value in representing actual facts about a class of which little is known.

"Several points disclosed by the figures are worthy of brief remark. Forty-two per cent of those questioned were of foreign birth, while eighty-six per cent were from outside of California. Of the foreign born, only twenty-one per cent were naturalized citizens, thirty-three per cent of the total number reviewed being aliens. Fifty-one per cent had been in California less than six years.

"As to schooling, fifty-five per cent had left school before the age of fifteen, while for twenty-six per cent there were no figures.

"The fact that seventy-nine per cent of the total were below the age of forty years is an indication of the killing effect, physically and industrially, of the life of casuality. Fifty-four per cent had been migratory and casual workers for less than ten years, while data were lacking for sixteen per cent.

"Twenty per cent worked on the average less than seven months of the year, while sixty-two per cent worked less than ten months. The best daily earnings of thirty-six per cent had never exceeded three dollars a day.

"As to occupations, seventy-six per cent had never been anything but common laborers. Even the twenty-four per cent who are classed as skilled had for the most part fallen or been forced out of the trade they professed. Thirty-five per cent were

or had been members of labor unions, while sixty-five per cent were absolutely unorganized. Fifty-one per cent sought what work they wanted or could get through the present inefficient and haphazard private employment agency system.

"The extent of social unrest among this class is shown by the fact that forty-two per cent express radical political and economic opinions.

"In regard to future plans, thirty per cent profess to be seeking steady work and planning to settle down. But a small proportion of these will ever actually attain economic stability. The strikingly large number of seventy per cent have no plans other than a mere continuation of the floating life they are leading."

The Personnel Research Federation will be glad to lend to any investigator a manuscript copy of the entire report including the statistical tables.

### SURVEY OF VOCATIONAL MISFITS

Impelled by the need for intensive study of the whole problem of the vocational misfit, thirty-eight leaders in their respective professions and industries have been engaged for some time in a survey of existing conditions. The list includes John Hays Hammond, Dwight F. Davis, Rear Admiral Eberle, Mary Roberts Rinehart, Jesse L. Lasky, Colonel Michael Friedsam, Joseph P. Day, Vernon Kellogg and David Belasco, and Presidents Angell of Yale, Olds of Amherst, Mezes of City College and Chancellor Brown of New York University.

Other contributors to the symposium are these railway Presidents: Holden of the Chicago, Burlington & Quincy, Budd of the Great Northern and Kenly of the Atlantic Coast Line; and President Kittle of Sears Roebuck & Co. and Paul D. Cravath, the lawyer.

According to the findings of the survey, the best years of the average worker are wasted and the number of misfits is "appalling." Mr. Holden says: "What America needs most, next to education in the dignity and social value of labor, is the fitting of young men and women to the work for which each is best adapted."

Dr. Mezes says: "It is safe to say that less intelligence and informed foresight is exercised in this than in any other matter of life-long importance, unless it be the choice of mates, by young men."

Arthur Roeder of the American Linseed Oil Company refers to two phases of the American educational system which are underdeveloped: "First, the selection of an occupation or a profession for the young men and women who carry their studies through the higher fields, and, second, teaching them how to use their attainments when gained.

Carl F. Dietz, President of the Bridgeport Brass Company, makes a similar charge. "One of the quarrels with institutions of higher learning," he says, "has been and is that little or no consideration is given the applicant for admission to specific professional courses from the standpoint of his fitness, other than his ability to jump certain more or less academic hurdles in the way of entrance or regents' examinations. Our complex professional business and industrial structure requires far more than merely academic or mental attainments."

"The large number of misfits in industry today, to my mind, is appalling," says Allister R. Tulloch, Secretary of the Western Massachusetts Branch of the National Metal Trades Association. "I find that this is so not only among those receiving a grammar and high school education, but college graduates as well, and there are times in this office when it appears that the college graduate outnumbers the high school student."

Referring to the economic waste involved, Mr. Kenly says: "In this highly specialized age it is more important than ever before that young people should find at the earliest possible moment the business or profession for which they are best suited."

The opinion expressed by Chancellor Elmer Ellsworth Brown of New York University is typical of that held by all the educators represented in the symposium. They admit not only the existence of the problem but also the difficulty of solving it satisfactorily. Chancellor Brown says: "There is great need of wisdom and in-

formation in the matter of guiding our American youth to make, each of them, the most of himself, both for himself and for society. It goes to the very core of democracy. In the colleges we are fumbling a good deal with the question of such guidance, and I imagine we shall do a good deal of fumbling for a long time to come."

"We are struggling with the problem here," says President Angell of Yale, while Professor William Starr Myers of Princeton says: "Not one student in ten, according to my twenty years' experience of college teaching, knows what he is going to do when he graduates from college, and many delays in careers, as well as outright misfits, are the result."—*New York Times, January 9, 1927.*

The inquiry referred to has been made by Edward L. Bernays, editor and compiler of the volume by 38 authors, entitled "An Outline of Careers: A Practical Guide to Achievement," to be published by Doran.

### AMERICAN MANAGEMENT ASSOCIATION

The winter convention of the American Management Association was held in New York at the Hotel Pennsylvania on February 15, 16, 17, and 18. Among the topics presented were many of value to personnel executives as follows:

Decentralized Responsibility with Centralized Coördination, by Donaldson Brown, Vice President, General Motors Corporation

Supervision and Leadership, by Henry C. Metcalf, Vice President, Continental Baking Corporation

Job Analysis as a Basis of Improving Management, by Harry Arthur Hopf, H. A. Hopf and Company

The Scope of Public Relations Activities, by W. S. Vivian, Director of Public Relations, Middle West Utilities Company

College Women in Business, by Louise Moore, Employment Service Manager, Dutchess Manufacturing Company

The Technique of Job Analysis as Applied to Office Workers, by Sterling B. Cramer, Vice President, Illinois Merchants Trust Company

Quantifying the Analysis, by Harry Dexter Kitson, Professor of Education, Teachers College, Columbia University

Progress Report of the Committee on Measuring Office Output, by John Mitchell, Chairman

Technique of Measuring Office Work by Means of a Stop Watch Illustrated by a Specific Case, by Mrs. Gertrude M. Ballsieper, Cheney Brothers

The Micro-Motion Method, Illustrated by a Specific Case, by R. N. Blakelock, General Electric Company

Ethics and Methods of Handling References, by Earl B. Morgan, Manager, Employment and Service Department, The Curtis Publishing Company

Advising Applicants, by William L. Fletcher, President, William L. Fletcher, Inc.

Status of Personnel Men in the Organization, by J. W. Dietz, Secretary, General Personnel Committee, Western Electric Company, Inc.

Scope of Activities of a Personnel Department, by Homer E. Niesz, Manager of Industrial Relations, Commonwealth Edison Company, and A. A. Knapp, Director of Personnel, The Coleman Lamp & Store Company

These papers together with reports of the discussion are being published in full by the American Management Association, 20 Vesey Street, New York.

### A NEW HUMAN RELATIONS ASSOCIATION

The International Association for the Study and Improvement of Human Relations and Constitutions in Industry was formed in June, 1925. Its organizing secretary is Miss E. Brenda Voysey, Goethestrasse 10, Zürich, Switzerland. Membership in the Association is open to all who are engaged in any undertaking involving the employment of a number of persons, or who are occupied in scientific research bearing on problems of industry, and who are in sympathy with the aims of the Association.

The activities of the Association may be summarized under three main headings:

Providing possibilities for the study and for the interchange of ideas and experience through the organization of meetings, summer schools, and congresses.

Creating industrial and public opinion by means of publications.

Maintaining and extending established contacts, particularly through the interchange of information and visits between members in the various countries.

A congress of members will take place every three years.

The Association has organized a summer school on the "Elimination of Unnecessary Fatigue in Industry" to take place this year in the Italian Lakes district (Baveno, Hotel Bellevue), from June 19th to 25th. The summer school is open to all members of the association. The Chairman of the school is Dr. Lillian M. Gilbreth, Montclair, N. J. Among the lecturers are Prof. T. H. Pear, University of Manchester, England, Dr. L. Carozzi, Chief of Industrial Health Service, International Labor Office, Geneva, Dr. Otto Lipmann, Director of the Institute of Applied Psychology, Berlin, and Prof. Giovanni Loriga, Chief Physician of the Factory Inspection Service, Rome. Among the subjects to be discussed are the history of fatigue study, work and temperament, the length of the working day and rest periods, the elimination of eye and ear fatigue, the influence of posture on the elimination of fatigue, and the elimination of fatigue caused by extremes of temperature, dust, dampness, vibration, etc.

### LECTURES AT THE NEW SCHOOL FOR SOCIAL RESEARCH

Harry A. Overstreet, who has been giving one of the courses in the teacher training course for adult education at the New School for Social Research, in the first semester of that institution, will discontinue his lectures in connection with that course in the coming spring term, according to a statement just made by Alvin Johnson, the director of the school. In the second term, Dr. Overstreet will give a course of twelve lectures on "The Newer Clues to Human Behavior," on Monday evenings at 8.20 beginning February 21.

The course will be devoted chiefly to the discovery of the major clues to the more accurate understanding and the more successful organization of human behavior. Particular emphasis will be placed upon normal adult life.

"Much of modern psychology," Dr. Overstreet says, "has concerned itself altogether with abnormal behavior. But normal life presents problems that apparently stand in equal, if not in greater, need of solvent clarification. Because of this emphasis upon normal adult life, it is hoped that the course may be carried on with the coöperative aid of the members of the class who should be able out of their own experience, to contribute permanent material to the psychological issues involved."

Dr. Bernard Glueck, the noted psychiatrist, who has recently returned from a year and a half spent abroad, where he has been associated with the leading European psychiatrists, is to give a course on "The Applications of Psychoanalysis," during the Spring term.

The course will embrace a discussion of the origins and developmental history of psychoanalysis with the view of demonstrating the similarities and divergences between it and other schools of psychology, as a necessary pre-condition to an understanding of its specific methodology and point of view.

While abroad, Dr. Glueck spent most of his time in London, Berlin, and Zürich. He found a growing interest in the possibility of the application of psychoanalysis to the understanding of various forms of personal maladjustments, as met with, for instance, in schools and colleges.

### A VOCATIONAL GUIDANCE COURSE FOR Y. M. C. A. WORKERS

In view of the keen interest in vocational guidance displayed by Young Men's Christian Association workers, Dr. H. D. Kitson has been requested to give an intensive two weeks training course in vocational guidance at the Y. M. C. A. summer school at Lake Geneva, Wisconsin, beginning June 24.

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THIS NUMBER COMPLETES VOLUME V

# The Journal of Personnel Research

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*Official Publication of*
*Personnel Research Federation*

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# The Journal of Personnel Research

**The Journal of Personnel Research** is the official organ of the Personnel Research Federation. It publishes original investigations in the applied sciences that contribute to knowledge and effective direction of people at work, thus carrying out the object of the organization, namely, "the furtherance of research activities pertaining to personnel in industry, commerce, education and government wherever such researches are conducted in the spirit and with the methods of science."

The Journal renders a service not only in centralizing information about personnel research, but also by furnishing a continuous month by month accumulation of authoritative material in this field. Significant contributions by specialists in the biological and medical sciences, psychologists, psychiatrists, engineers and economists have been published.

Successful personnel administration consists in making effective and satisfying adjustments between men and their occupations. Such administration demands judgment based on knowledge of the conditions under which people work productively and happily. It is increasingly important for the administrator to know the methods and results of such scientific studies. To make them currently available is one of the functions of the Journal of Personnel Research.


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